# Chemical Week

June 15, 1957

Price 35 cents

**MCA meets at White Sulphur Springs,** is told to shout out the management viewpoint . . p. 34

**The ethylene oxide overcapacity** –it looks as if producers will live with it until 1963 . . . . . p. 77

**Tonnage-oxygen output** is riding high, buoyed by demand from steel and chemical makers . p. 92

**Measure your next capital project** against a profitability yardstick. CW Report tells you how . p. 115

**Refugee Hungarian researcher** finds a new life in U.S. Big difference: freedom . . . . . p. 132

A McGRAW-HILL PUBLICATION

UNIVERSITY MICROFILMS INC
313 N 1ST ST
ANN ARBOR MICH

# SOLVAY Anhydrous ALUMINUM CHLORIDE

## ...in screen sizes that will fit your needs

### PROPERTIES

**APPEARANCE: SOLVAY Anhydrous Aluminum Chloride is a yellow crystalline solid.**

| | |
|---|---|
| Specific gravity 25°/4°C.: | 2.44 |
| Melting point (sealed tube): | 190°C. |
| Boiling point, 752 mm.: | 182.7°C. |
| Sublimation point: | 180°C. |
| Odor, in dry air: | None |

**SOLUBILITY:**

| | |
|---|---|
| Water | soluble |

With proper care, about 70 parts by weight of aluminum chloride can be dissolved in 100 parts of water at 15°C. (59°F.) At higher solution temperatures decomposition occurs with the evolution of volatile chloride compounds.

| | |
|---|---|
| Alcohol | complete |
| Ether | complete |
| Carbon tetrachloride | soluble |
| Chloroform | soluble |
| Benzene | insoluble |

Aluminum Chloride • Vinyl Chloride • Para-dichlorobenzene
Calcium Chloride • Potassium Carbonate • Monochlorobenzene
Sodium Nitrite • Caustic Potash • Caustic Soda • Soda Ash
Snowflake® Crystals • Ortho-dichlorobenzene • Chloroform
Ammonium Chloride • Sodium Bicarbonate • Methyl Chloride
Ammonium Bicarbonate • Cleaning Compounds • Chlorine
Methylene Chloride • Hydrogen Peroxide • Carbon Tetrachloride

This high purity material—available in varied screen sizes—is highly effective as an alkylation catalyst used in producing styrene, synthetic detergents, high octane aviation gas. Makers of ethyl chloride and butyl rubber also value its catalytic action. Other applications occur in such diversified fields as insecticides, pharmaceuticals, phenol, synthetic resins, petroleum cracking, dyestuffs and intermediates.

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**How can you apply it?**
***Mail coupon for sample, data!***

Allied Chemical

**SOLVAY PROCESS DIVISION**
ALLIED CHEMICAL & DYE CORPORATION
**61 Broadway, New York 6, N. Y.**

Please send me without cost the following SOLVAY Anhydrous Aluminum Chloride items:

☐ Test sample ☐ Literature

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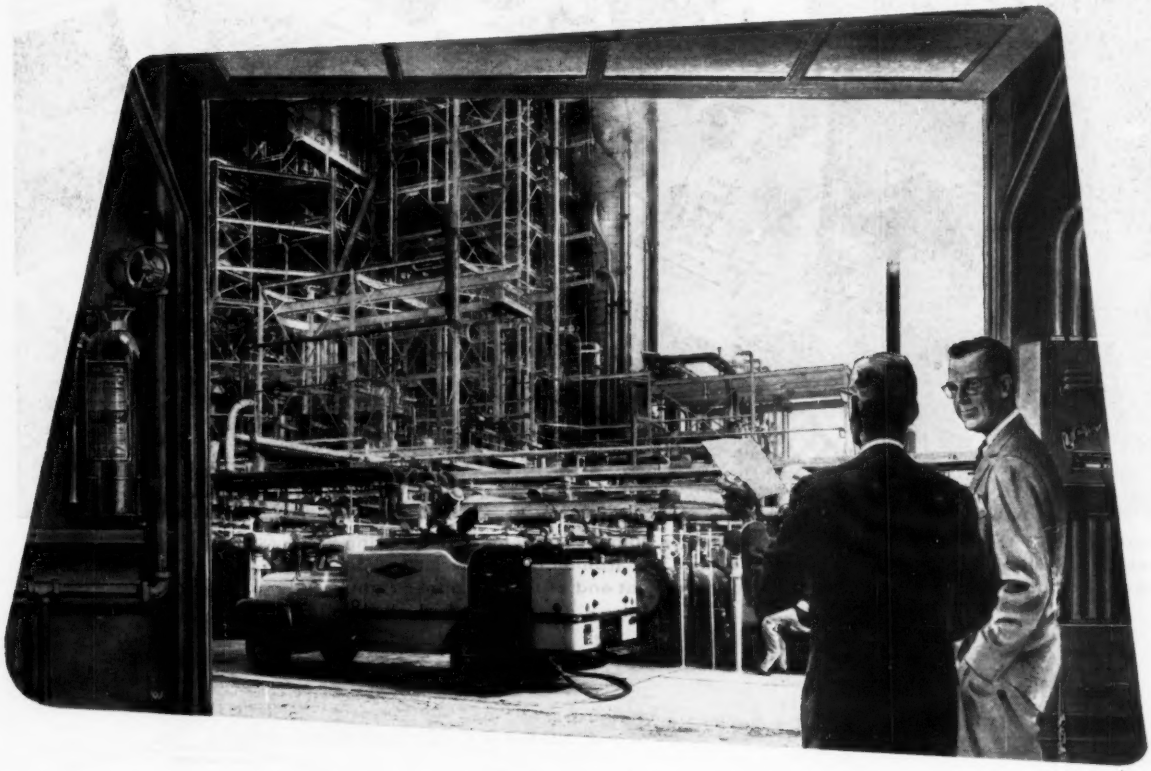
Position_____
Company_____
Phone_____
Address_____
City_____ Zone____ State_____

AN-6

# *Dowell Service Helped This Plant Profit By Saving $312,700 in Maintenance Costs!*



To clean and service the giant catalytic crackers in today's modern refineries is quite a job . . . and very costly. Costly, that is, unless Dowell Service is on the job to help clean the "cats"—chemically. Here's an example of how Dowell chemical cleaning service cut turnaround costs for one refiner by $312,700.

Dowell was called in to provide cat cracker turnaround service which included the cleaning of: two flue gas coolers, two catalyst coolers, four overhead aftercoolers, one light gas oil cooler, one heavy gas oil cooler, two top tray reflux coolers, and two final gas condensers.

Dowell's time: thirteen and one-half hours; Cost: $2300.

It is estimated that this same cat cracker service, if done by mechanical methods, would have cost the refinery: 1) Additional downtime of seven days—$210,000; 2) Additional spare bundle inventory—$100,000; 3) Labor—$5,000.

The refinery enjoyed a $312,700 operating credit from this single cat cracker turnaround—not including expected efficiency increases.

Dowell provides expert service in removing scale and sludge from product, process and steam generating systems. Dowell does the job for you—furnishing all chemical solvents, trained personnel, pumping and control equipment. Furthermore, Dowell has the experience in chemical cleaning to provide assurance of a job well done.

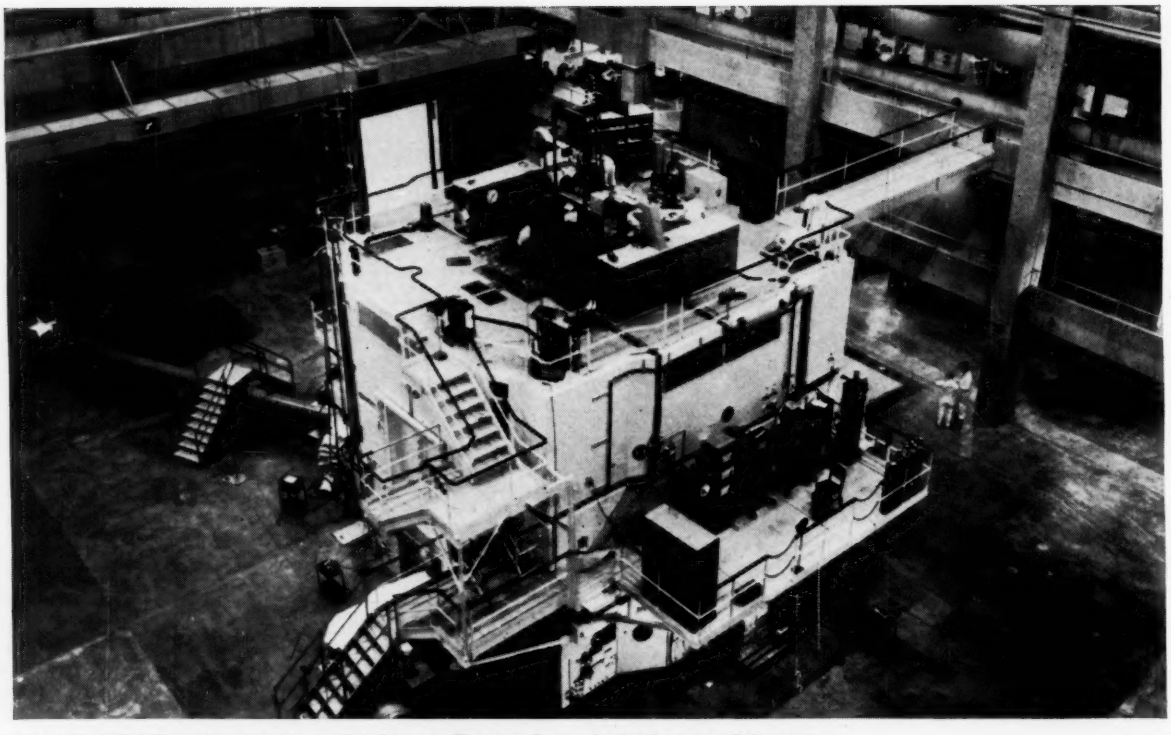
While the example here deals with an oil refinery, Dowell chemical cleaning has recorded similar profit-making savings for other industries. Dowell engineers can show you performance data in almost any field — steel, chemical, power, paper, construction.

For specific information on how Dowell chemical cleaning can help your plant to greater profits, call the Dowell office nearest you. Or write Dowell Incorporated, Tulsa 1, Oklahoma.

***have Dowell clean it chemically***

**DOWELL**

A SUBSIDIARY OF THE DOW CHEMICAL COMPANY



World's FIRST testing reactor—the Atomic Energy Commission's materials testing reactor at Idaho Falls, Idaho. Blaw-Knox served as architect-engineer. Neutron "chopper" tube is on main floor, left; control room is at end of bridge, upper right.

# Blaw-Knox engineers two firsts in Atomic Testing Reactors

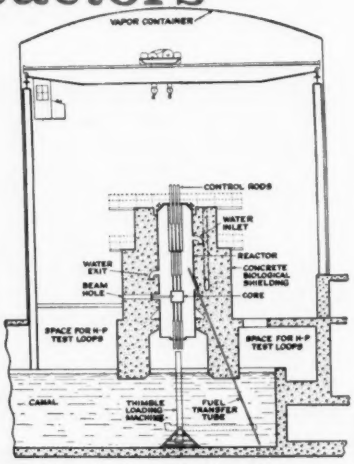
The need for testing reactors is so great that the Atomic Energy Commission has announced a new testing reactor policy, which encourages the building of testing reactors by private industry. As AEC states: ". . . a large part of its (the Commission's) requirements for test reactor facilities can be met with privately-owned reactors based on proved designs and technology."

Blaw-Knox has played a prominent role in developing this technology. Our experience includes serving as architect and engineers on:
. . . the world's *first* materials testing reactor for the AEC
. . . the world's *first* testing reactor for commercial use

With this background we are well prepared to serve you in—

- scoping the project
- preparing feasibility reports
- summarizing hazards reports
- detailing engineering
- procurement and fabrication of parts
- construction of the facility
- initial operation
- training of operators

We welcome the opportunity to work with you on any proposed project in this active field of nucleonics.




Sectional view of privately-owned testing reactor, engineered by Blaw-Knox, shows general assembly, control rods and pressure vessel.

BLAW-KNOX

## BLAW-KNOX COMPANY

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Chemical Week

## TOP OF THE WEEK

June 15, 1957

- **How will Du Pont dispose of its GM stock?** Three major methods gain business world's attention .....p. 33
- **Supermarket sales of little-known specialties are feasible**—if you use a "rack jobber" to help you sell them .....p. 41
- **Reichhold hires local residents as overseas plant managers,** brings them to U.S. for intensive training .....p. 61


**17 BUSINESS NEWSLETTER**

**22 BEHIND THE NEWS**

**34 BUSINESS NEWS**

Top management of chemical industry gather at White Sulphur Springs. Here's what they discussed.

**36** Discussion of Du Pont decision is rife; deposit of company's General Motors stock in voting trust proposed.

**37** Legislators and lobbyists in Washington look to '58 as year of decision on chemical legislation.

**38** Take a look at Farbenfabriken Bayer. It's adding an aggressive Western Hemisphere sales push to its European activities.

**41 SPECIALTIES**

Here's an easier way to get your specialty product sold in supermarkets: utilize a service merchandiser.

**46** Liquid, powder insecticide sales both show substantial growth.

**57 WASHINGTON NEWSLETTER**

**58 CHARTING BUSINESS**

**61 ADMINISTRATION**

Reichhold trains local management for its overseas plants, sees managerial skills as essential in foreign operations.

**65** Incoming plywood shipments are growing. Do they pose a threat to some U.S. chemical suppliers?

**77 MARKETS**

"Temporary" U.S. ethylene oxide overcapacity probably won't be completely absorbed before 1963.

**89 TECHNOLOGY NEWSLETTER**

**92 PRODUCTION**

Use of tonnage oxygen in partial-oxidation processes, new steelmaking techniques emphasize trends in oxygen plant construction.

**98** Australian plant that makes gas from brown coal is about to hit rated capacity.

**100** Portability and versatility are characteristics of new urethane foam-producing machine.

**107 SALES**

Sales management executives spell out ways to promote a meeting of the minds between buyer and seller.

**108** Here's how purchasing men view outlook on fuels, steel and nonferrous metals.

**115 CW REPORT**

Management should be aware, authors assert, of ways to plot the profitability of planned capital expenditures.

**129 MARKET NEWSLETTER**

**132 RESEARCH**

Relocated Hungarian research chemist compares his life in the new world with that in the old.

**138** Bell Labs turns up new crystal useful in electronic applications.

**145** First report: here are the details of construction of that nuclear reactor proposed for aircraft use.


**Vol. 80**
**No. 24**

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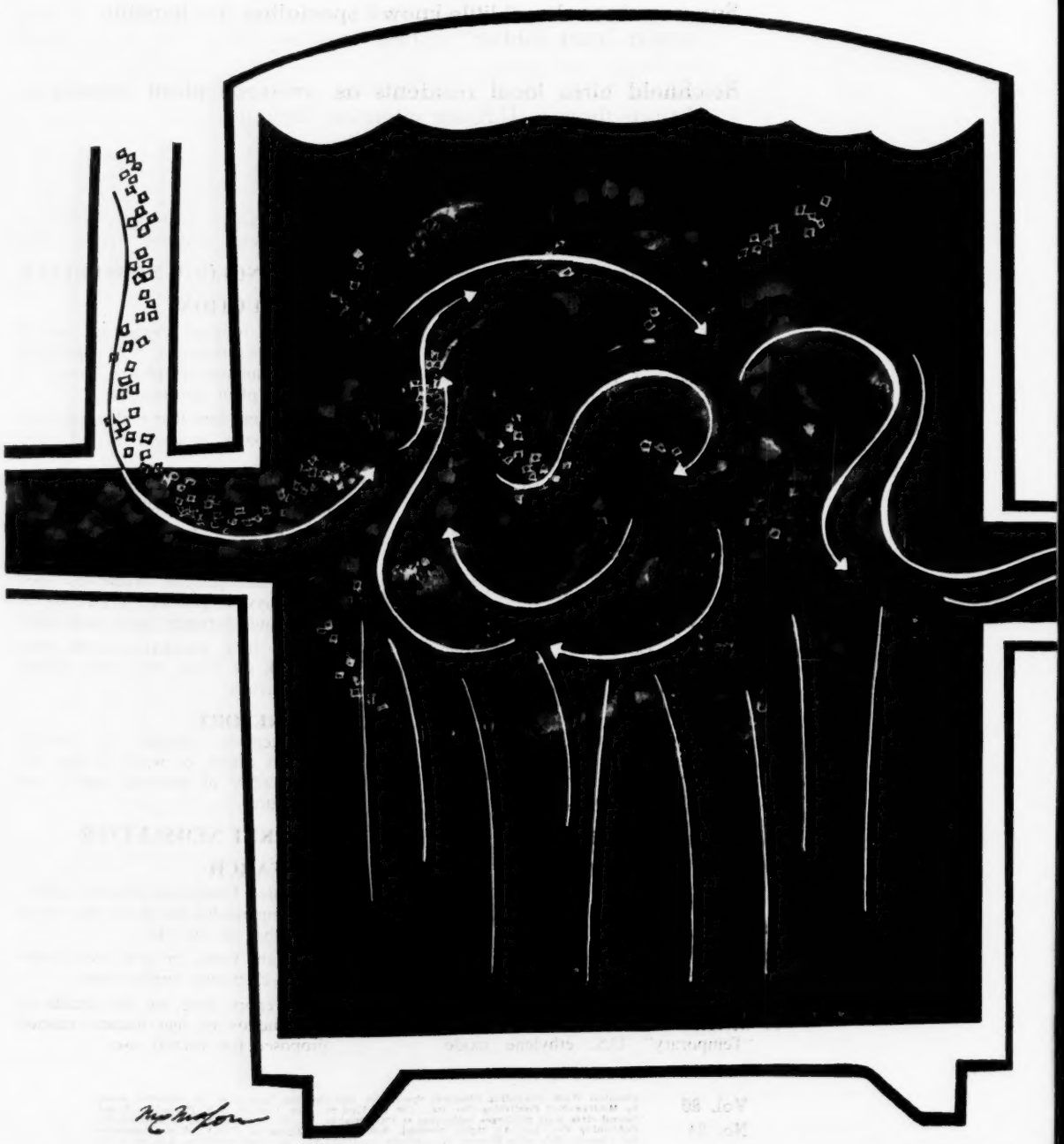
# Armour Organics Stop Sludge in Refinery Products



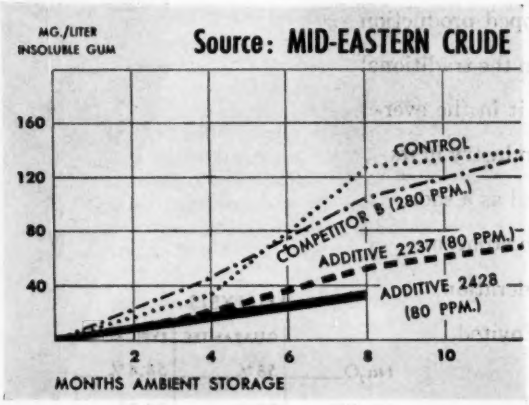
Here is a unique group of polar organic surface active chemicals that meet the toughest industry requirements for fuel additives. They can be important to you because:

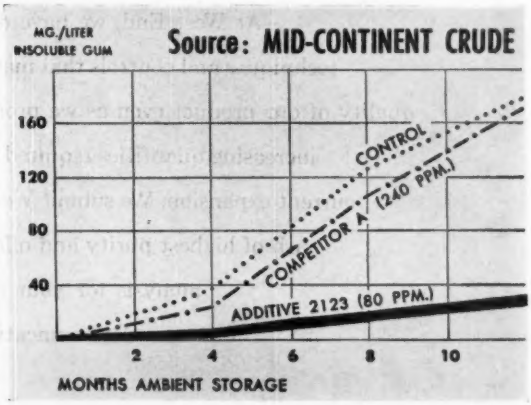
(1) Insoluble gums can now be effectively solubilized or inhibited for as low as *1¢ per barrel.*

(2) Filterability and color stability can be controlled to meet the strictest "specs." Unstable furnace oils, which previously caused filter plugging in burner operations and exhibited color degradation, are no longer a problem when Armour additives are used.

## ARMOUR PRODUCTS EXCEL IN 12 MONTHS STORAGE TESTS

Four fuel oil stocks (West Texas, Mid-Continent, Venezuelan and Middle East types), have been subjected to 12 months ambient storage conditions using 41 potential additives. These 41 additives resulted from the screening of over 300 chemicals. Four Armour products (3 graphically shown below) were outstanding in their ability to inhibit and/or solubilize gum and stabilize against radical color change. In addition, most effective for West Texas crudes was Armour Additive #2528; for Venezuelan crudes, Additive #2237.




## OTHER REFINERY APPLICATIONS

Even the most rigid specifications for stabilization and corrosion inhibition of gasoline, diesel and jet fuels can be met by adding Armour chemical additives.

Armour polar organic surface active agents have the innate ability to adsorb onto metal surfaces, rendering such surfaces hydrophobic. When used in lubricating oils and greases, this property, plus superior lubricity and corrosion protection, assures longer machine life. In addition, this adsorption characteristic also helps inhibit corrosion and fouling in operational equipment.

The Armour Chemical Division is ready to help you utilize the proper additive for your special situation. Let our trained staff assist you by recommending the Armeen® or Duomeen®, or one of their derivatives, specifically designed to solve your problem.

**ARMOUR**

*Leader In Progressive Fatty Acid Chemistry*

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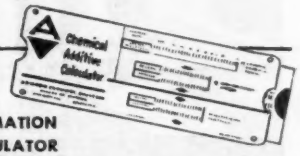


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☐ Chemical additive "Slide Rule" Calculator.

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(Fill in chemical desired)

Applications information on _____

NAME _____ TITLE _____

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CW6

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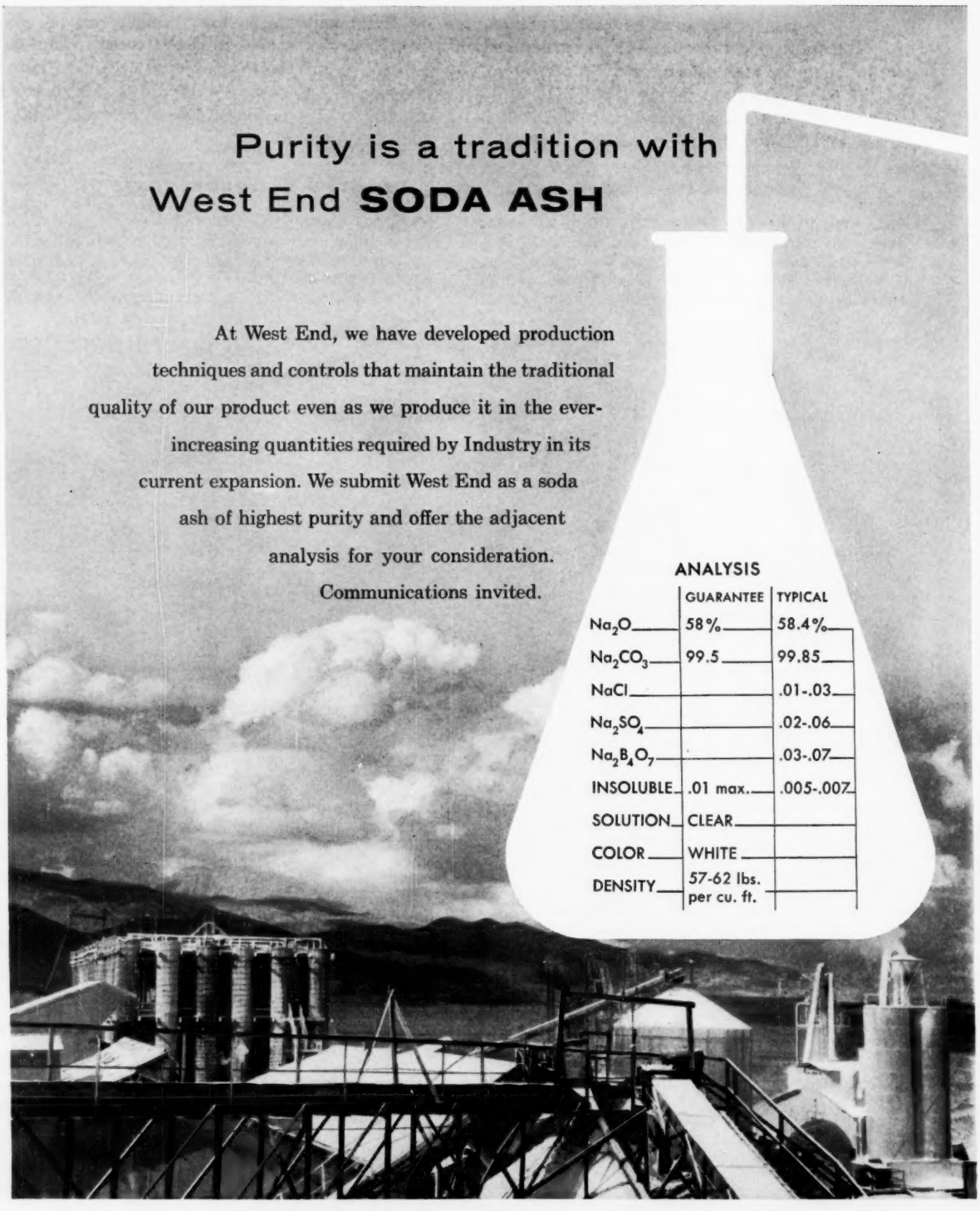
At West End, we have developed production techniques and controls that maintain the traditional quality of our product even as we produce it in the ever-increasing quantities required by Industry in its current expansion. We submit West End as a soda ash of highest purity and offer the adjacent analysis for your consideration. Communications invited.

**ANALYSIS**

| | GUARANTEE | TYPICAL |
|---|---|---|
| $Na_2O$ | 58% | 58.4% |
| $Na_2CO_3$ | 99.5 | 99.85 |
| NaCl | | .01-.03 |
| $Na_2SO_4$ | | .02-.06 |
| $Na_2B_4O_7$ | | .03-.07 |
| INSOLUBLE | .01 max. | .005-.007 |
| SOLUTION | CLEAR | |
| COLOR | WHITE | |
| DENSITY | 57-62 lbs. per cu. ft. | |



WEST END

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DIVISION OF STAUFFER CHEMICAL COMPANY

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## New Rectifier Cooling System Prevents Heat Build-up and Damage

# when ac Power Fails

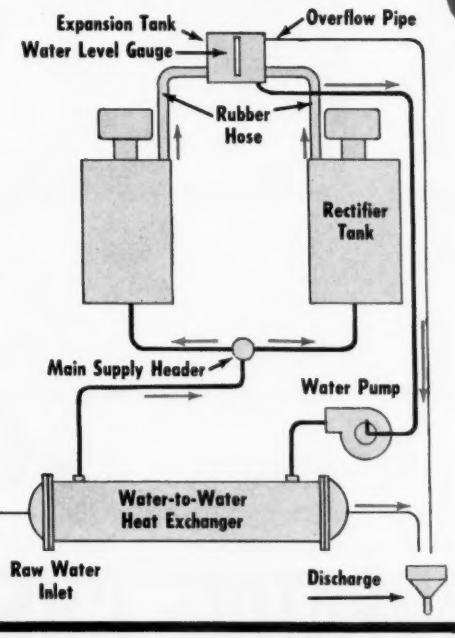
A SAFER, more effective cooling system in the Allis-Chalmers rectifier continues to circulate water *even when an ac power failure stops the water pump.* Heat and steam are dissipated before they can develop to the danger point.

The new system features an expansion tank that extends the full length of the rectifier frame with short vertical connections from each tube. With warm water continuing to flow freely upward, a thermo-siphoning action draws cooler water into the tubes. Build-up of excessive temperatures is prevented. Steam pockets are kept from forming. Subsequent water loss from the recirculating cooling system is minimized.

Successful operation in hundreds of installations is your assurance of the complete reliability of Allis-Chalmers mercury arc rectifiers. Contact your nearby A-C office or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wis.

### How the System Works

Water is normally pumped through the water-to-water heat exchanger to the main supply header from where it circulates through rectifier tubes picking up heat. Hot water flows up through the short connections to expansion tank and back down to suction side of water pump.




**ALLIS-CHALMERS Mercury Arc Rectifiers**

Factory-packaged units cut installation time and costs. Sealed tube rectifiers are supplied in completely enclosed or open types. Here is a typical, completely enclosed, 1000-kw, 250-volt rectifier for steel mill service.

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Today, Reichhold makes hundreds of resins for surface coatings. Among the newest are RCI Isophthalic Acid Alkyds, Melamine-Formaldehyde Resins, Epoxies, and PVAc and Alkyd Emulsions.

If *you* have a problem involving surface coating resins, write RCI for help in solving it. If you would like full information on the new RCI Isophthalic Acid Alkyds, write for *SUPER-BECKOSOL Booklet.*

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Harshaw fluorides serve many industries advantageously. Their top ranking is the result of rigidly controlled uniformity and quality.

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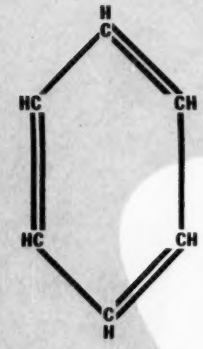
- Fluoboric Acid
- Fluorine Cells
- Fluorinating Agents
- Frosting Mixtures
- Hydrofluoric Acid Anhydrous
- Hydrofluoric Acid Aqueous
- Hydrofluosilicic Acid
- Lead Fluoborate
- Metallic Fluoborates
- Potassium Bifluoride
- Potassium Chromium Fluoride
- Potassium Fluoborate
- Potassium Fluoride
- Potassium Titanium Fluoride
- Silico Fluorides
- Sodium Fluoborate
- Tin Fluoborate
- Zinc Fluoborate
- Zinc Fluoride

## 4 proven steps to

# HIGH PURITY PHENOL

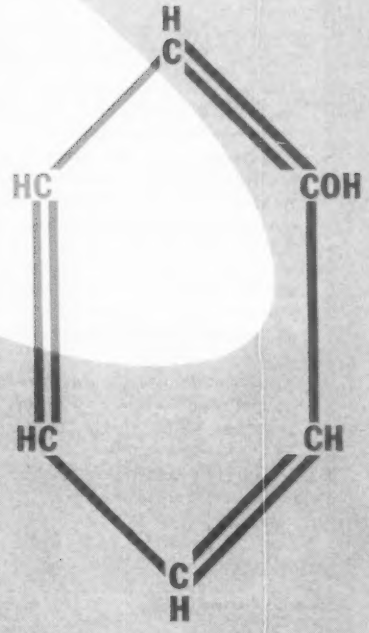



sulfonation

fusion

acidification

distillation




As a result of continuing research into the simplification of the sulfonation process, Foster Wheeler now has designed and engineered phenol plants in capacities from 2 tons per day up.

This know-how is backed by over 30 years of experience in the design and construction of petroleum, petrochemical and chemical processing plants all over the world.

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**SOUTHERN STATES IRON ROOFING COMPANY**
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Diethyl hydrogen phosphite
Dibutyl hydrogen phosphite
Bis(2-ethylhexyl) hydrogen phosphite
Trimethyl Phosphite†
Triethyl phosphite†
Triisopropyl phosphite†
Tributyl phosphite†
Trihexyl phosphite†
Triisooctyl phosphite†‡
Tris(2-ethylhexyl) phosphite†
Tris(2-chloroethyl) phosphite
2-Ethylhexyl octylphenyl phosphite
Diethyl ethylphosphonate
Dibutyl butylphosphonate
Bis(2-ethylhexyl) 2-ethylhexylphosphonate
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‡U. S. PAT. 2,722,479

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# Business
## Newsletter

CHEMICAL WEEK
June 15, 1957

**Labor's rights and responsibilities are more sharply defined** in decisions made last week in both U.S. and Canadian Supreme Courts. In a decision somewhat obscured by the attention given the ruling in the Du Pont-General Motors antimonopoly suit, the U.S. high court said federal courts can force both companies and labor unions to live up to the arbitration clauses in their labor contracts. The ruling makes the powers of the federal courts considerably broader. In the past, federal courts have ruled only in damage cases growing out of contract violations.

**In Canada: labor unions cannot be held liable for torts.** The dominion's high court ruled that unions don't have "contractual capacity," hence cannot incur "liabilities in tort." The decision came in a case where a union member sought a $5,000 judgment from his local teamsters union, whose executives had suspended him. The court held that the executives acted beyond their powers, but that the membership could not be held liable for their actions.

•

**Expansion plans of Niagara Falls chemical firms are hazy** because of uncertainties in "the power situation." That, at least, is the dilemma in which Union Carbide's Electromet Division finds itself, according to H. K. Intemann, Electromet's president.

He told a group of the company's technical personnel there last week that the firm would like to expand in the area, but is "up against it as long as the power situation remains unsettled." He said power costs at Niagara Falls were higher than at any other Electromet location, urged engineers to try to get 15-20% more production out of present equipment.

**Chemical industry employment has fallen off at Niagara Falls,** a recent survey by the New York State Employment Service Shows. Scattered layoffs have been made by Vanadium Corp. of America, Hooker Electrochemical Co., Electromet, Carborundum Co., Pittsburgh Metallurgical Co., International Graphite Corp., and several others. Balancing factors come from other companies, though. Payrolls are swelling from expansions at Olin Mathieson's abuilding high-energy fuel facilities, Goodyear Tire & Rubber's chemical plant.

•

**New plants and expansion are in the news elsewhere.**

**Westvaco is contemplating a new sea-water-to-magnesia plant,** which it would build in the Texas Gulf area. The proposed plant would start with raw sea water, react it with dolomite to precipitate magnesium hydroxide, which would be roasted to obtain the oxide. Kaiser now uses this process, though it would be a new one for Westvaco—which currently recovers magnesium hydroxide from bitterns obtained by the solar salt process.

# Business
## Newsletter

(Continued)

**Standard Oil of California will biuld a paraxylene unit** at its Richmond, Calif., refinery, adjacent to one already there. The unit, which will cost $3 million, will up capacity by 25 million lbs./year. The company expects to put it onstream early in 1958.

**Nichols Chemical Co., Ltd., will make industrial fine chemicals** at a plant to be built at Valleyfield, Que. Nichols, an affiliate of Allied Chemical's General Chemical Division, will manufacture tonnage quantities of metallic and alkali fluoborates and fluorides, inorganic salts including nitrates, sulfates and acetates. Also at Nichols' Valleyfield location: an operating sulfuric acid unit. A liquid hydrofluoric acid unit is under construction.

**Du Pont expects an early startup of its cellophane unit** abuilding at Tecumseh, Kan. The company has advanced the due date three months, now hopes the 50-million-lbs./year plant will be operating by the last quarter of '58. "Generally favorable conditions" in the flexible-film market are attributed as factors influencing the move.

**But Du Pont will close its Arlington, N. J., plant** within the next two years. The 71-year-old polychemicals facility, owned and operated by Du Pont for 50 years, is no longer "economically justified." About 735 employees will be furloughed, retired or transferred in the process.

•

**Celanese has a new antistatic treatment for its Arnel fiber.** The long-lasting treatment—and it's a processing step, rather than a coating or additive—converts the surfaces of the triacetate Arnel fiber into cellulose. It's a simple process—but one that works only with Celanese's own fiber. A low-concentration sodium hydroxide bath just before the dyeing step does the trick. Already, Celanese says, some 5 million yds. of Arnel fabric has been given the treatment.

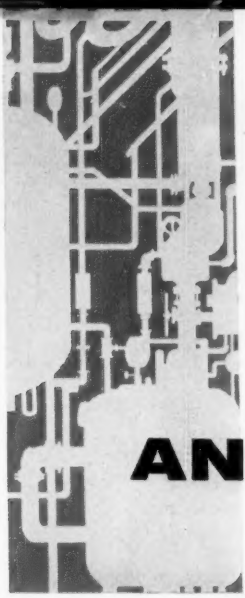
And Celanese may build additional textile manufacturing facilities. It has optioned 76 acres near Siloam, N.C., but as yet has no definite plans for building.

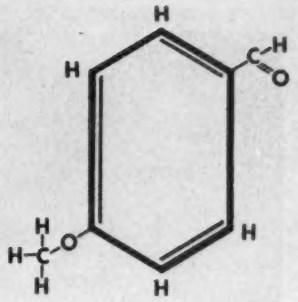
•

**DeMert & Dougherty's already back in operation** after a $250,000 fire that virtually wiped out one of its plants (*CW Business Newsletter, June 1*). Production was only slightly crippled: the specialties maker and aerosol filler (Aeropak) had other plants in Chicago ready to take on all but the aerosol load; and by scrambling hard, borrowing equipment, it was able to resume filling aerosols within a week.

•

**Newlyweds will have to dodge scented rice.** Angelique Inc. (Wilton, Conn.) is now selling a nonedible, only-for-throw rice scented with its White Satin perfume. It's a sweet touch, but it doesn't come cheap —7-oz. box of rice sells for $1.50.





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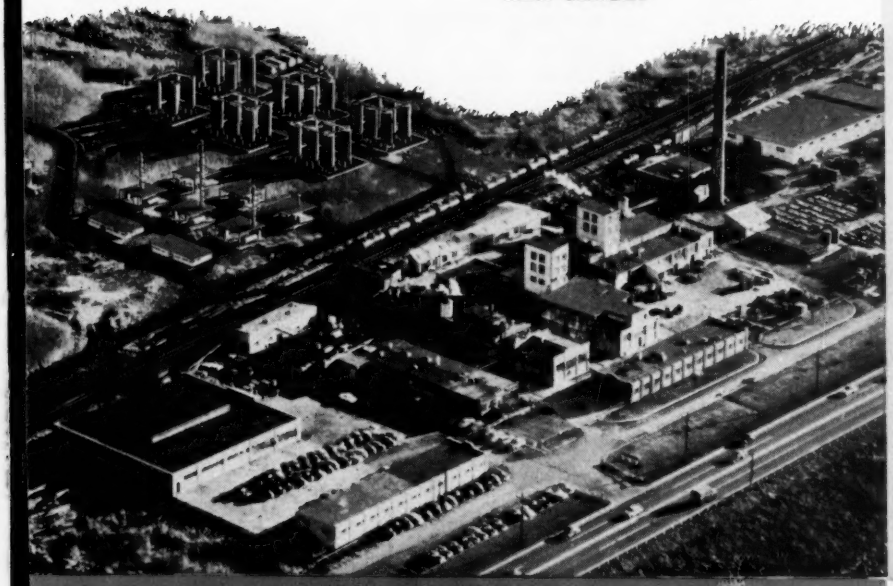

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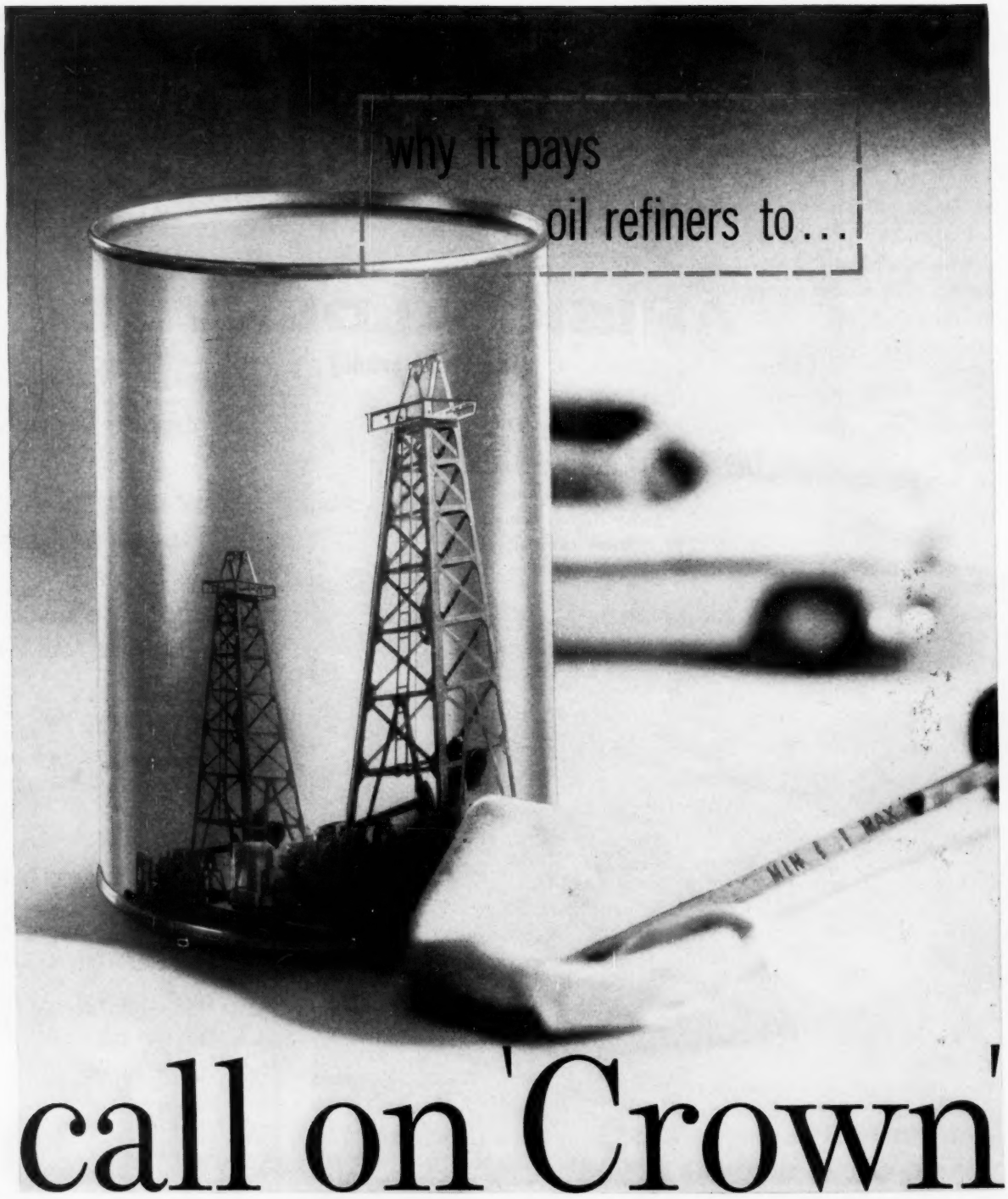


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## 'Jay Just Called From the Hill . . .'

**"The story appearing** on these two pages broke on Monday after this issue of *CW* had gone to press. We feel, however, that the Du Pont case has first-order significance, merits the best and fastest reporting we can give. Hence the story we had set up for this space was taken off the press and a new one written. . . ."

This explanation appeared in the upper left-hand corner of page 20 of *CW's* June 8 issue, heralding, in small type, an effort to give *CW* readers a broad, interpretive report on late-breaking news.

It all began at 1:07 p.m. last Monday when Don Loomis, news editor in *CW*'s Washington bureau called Assistant Managing Editor Bill Olcott in New York. Don's conversation began like this: "Jay just called from the Hill: the Supreme Court ruled on the Du Pont-GM case. Du Pont lost. Can we still make the front-of-the-book?"

The presses handling the front-of-the-book—the general news section in the front of the magazine—had been rolling for 23 minutes. The printer was told to stop the run, destroy the copies already printed. By this time, correspondent Jay Flocken, the Washington bureau's antitrust expert (and a lawyer, of course), had returned from the court on Capitol Hill to the office, and had started to read 68 closely packed pages of legal opinion.

In New York, meanwhile, Managing Editor Schulz was mobilizing his forces. *CW* editors were checking files to brush up on the background of the case. Associate Editor Bob Warren got—and stayed—in touch with Wilmington; by 2:15, Du Pont officials read him the just-released statement of Du Pont President Crawford H. Greenewalt. This, penciled hastily on three sheets of paper, was added to the 4-in.-thick file of court briefs on the case and other source material that Business News Editor Cooper McCarthy was putting into his briefcase. At 3:25, with a portable typewriter and two photoengravings, McCarthy and Olcott set off for Philadelphia and the printer.

On the train, they talked by radiotelephone to Flocken and Loomis in Washington, wrote the chronology of the case that appeared with the story.

By the time they arrived at the printer, half of the copy sent by Teletype from Washington was already set. Soon, the Teletype from here in New York was chattering with a new lead for the story (written by Administration Editor Homer Starr—the man who wrote virtually all of *CW*'s previous stories on the case).

Finally, at 9:17 p.m., the last page proofs were okayed and *CW* went to press, just under 10 hours late.

Were the effort and the expense worthwhile? We think so. As we said, ". . . to give management men the best news coverage in the chemical process industries."

Howard C. E. Johnson
Editor-in-Chief

### 'C,' not 'r'

TO THE EDITOR: We read with interest the article appearing in the April 27 issue titled "Northwest Pulpers: Gluttons for Chemicals."

In your listing of chemical consumption by 33 plants in the Northwest, you list Lyroid, which we believe is intended to be Lycoid. This indicates a consumption of 101 tons, which is a misleading figure and would tend to contradict the information that we have been giving to the mills in that area.

To seven mills alone, during 1956, our company shipped a little under 600 tons of Lycoid.

We thought you would be interested in this correction of the facts.

KENNETH ARNOLD
Manager
Paper Mills Dept.
Stein, Hall & Co., Inc.
New York

*Reader Arnold is indeed correct in that Lyroid should have read Lycoid.* —ED.

### Antifreeze Figures

TO THE EDITOR: . . . with reference to your recent publication (*May 18, p. 70*) of the figures taken from our recent antifreeze survey . . .:

Your running this survey information is much appreciated. However, we should like to point out that perhaps there has been some misinterpretation of the . . . survey figures as put out by this office. The very last sentence in your article reads, "Actual amounts covered in the survey (before they were projected by CSMA to give an over-all total): 67,807,012 gal. of ethylene glycol, 15,040,528 gal. of methanol." The implication herein is that these were the actual figures, and the 107-million-gal. total referred to in the beginning of the article was only an estimate based on the fact that we did not have complete coverage in the survey. This is a completely erroneous interpretation. The 107-million-gal. total is an accurate total based on the complete returns of all participating companies, while the figures referred to at the end of your article are actually only those applying to antifreeze put up in smaller packages. At the end of our survey, there is a table from which the figures you quote were taken. This table is specifically headed "Packaged Antifreeze Sales." Within the table, we indicate figures "in quarts, in gallons, in drums."

A. A. MULLIKEN
Assistant Secretary
Chemical Specialties
Manufacturers Assn.
New York

### Hoechst in the U.S.

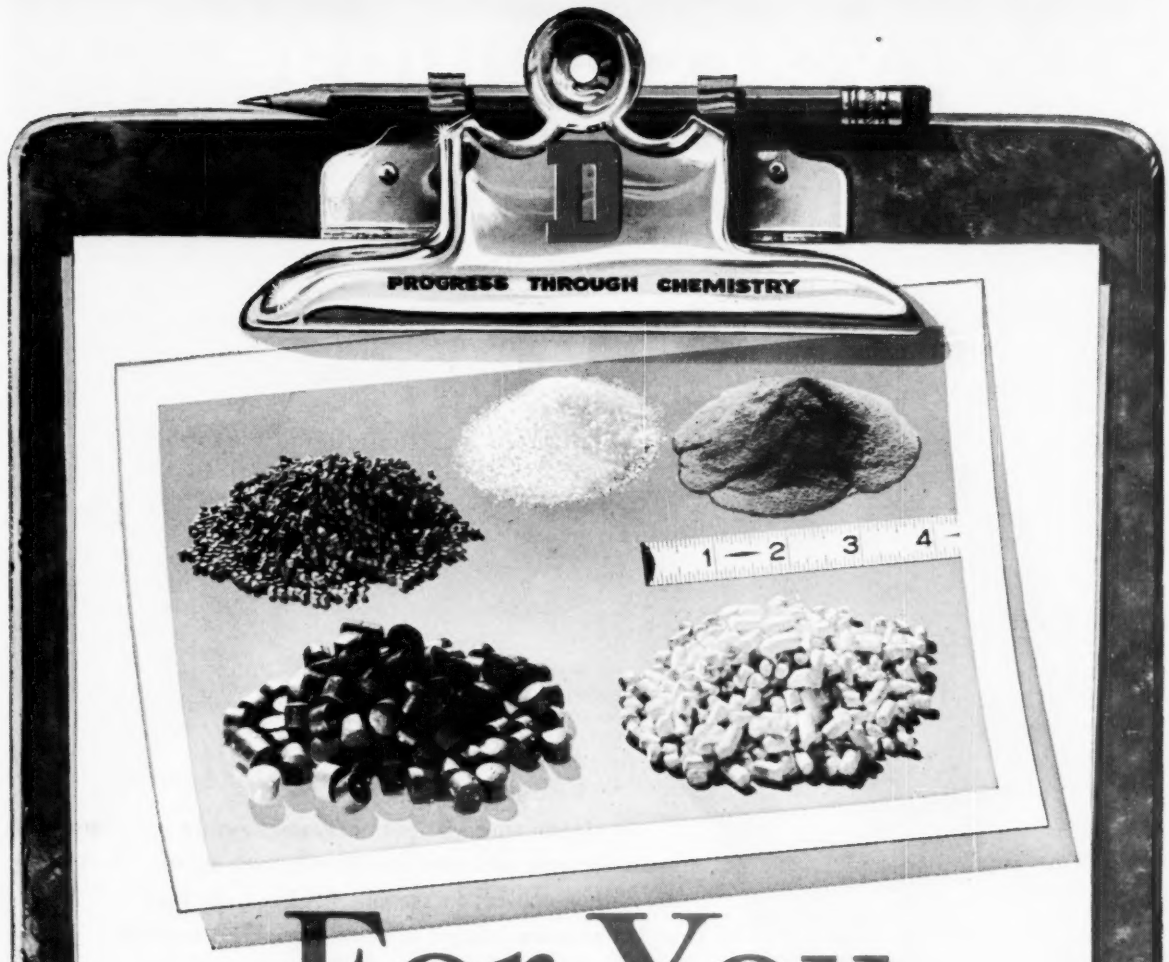
TO THE EDITOR: In your article about Hoechst/West Germany (*May 18, p. 24*), are the following points to which we would like to add:

(1) The subsidiary plant in Brazil is being constructed in cooperation with W. R. Grace & Co., Inc.

(2) There is no dyestuff plant in New York, but there is one in West

*CW* welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

Address all correspondence to: H. C. E. Johnson, Chemical Week, 330 W. 42nd St., New York 36, N.Y.

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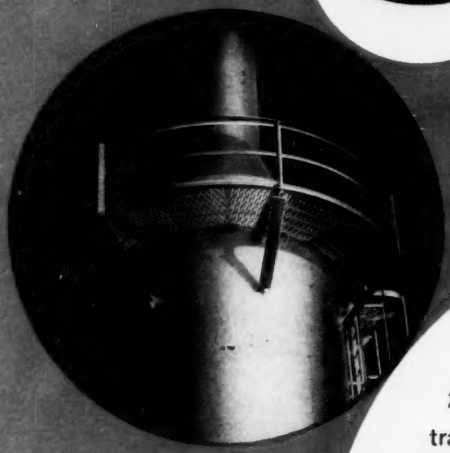

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## OPINION

Warwick, R. I., under the name of Hoechst Chemical Corp.

As to the developments in the United States, we would like to state the following facts:

Intercontinental Chemical Corp. (New York City), associated with Farbwerke Hoechst AG., has purchased the majority interest in Carbic Color and Chemical Co., Inc. (New York City), which adds to its sales line imported dyestuff specialties of Hoechst and products manufactured by Hoechst Chemical Corp. (West Warwick, R. I.), another affiliate of Intercontinental Chemical Corp.

Intercontinental also owns the controlling interest in Progressive Color and Chemical Co., Inc. (New York City), which continues to sell chemicals and intermediates and a variety of other products manufactured by Hoechst.

K. G. WIESCHENBERG
Intercontinental Chemical Corp.
New York

### Market Bench Marks

TO THE EDITOR: Please accept my compliments on your April 27 report titled "Market Research: The Neophyte Sets a Fast Pace." The benchmarks you set out in the report will be very helpful in many ways . . . .

R. C. LINDSTAEDT
Market Research
Eli Lilly and Co.
Indianapolis, Ind.

### Wasted Time

TO THE EDITOR: Congratulations on the CW Report on paperwork control (*May 18*). The most vital commodity available is management time; and man, how it is wasted!

Your contribution to top management's thinking through such articles will lead many a top management executive to take a look at his own internal paper controls . . . . Wonderful article.

HARVEY C. KRENTZMAN
Industrial Consultant
Brookline, Mass.

### Oatmeal Rheology

TO THE EDITOR: The only abstracting that Standard Oil Co. (Indiana) researchers' wives do, that we know about, is in areas of rheology of oatmeal and scheduling turn-arounds of


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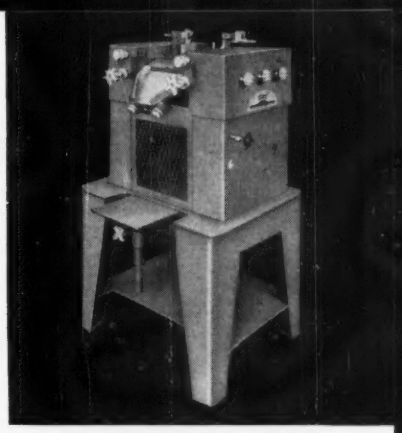
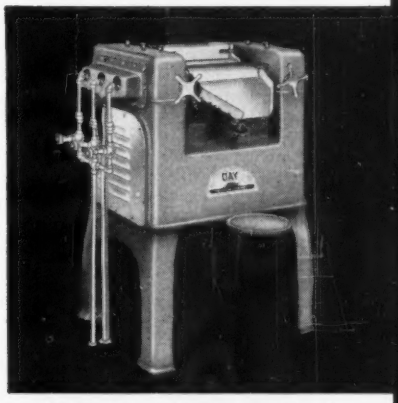
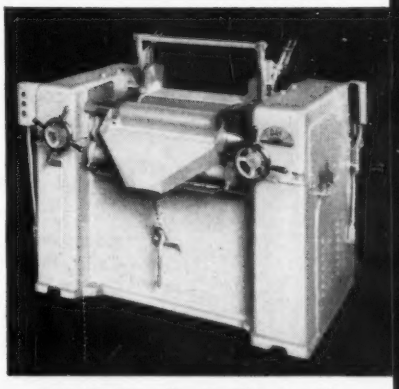


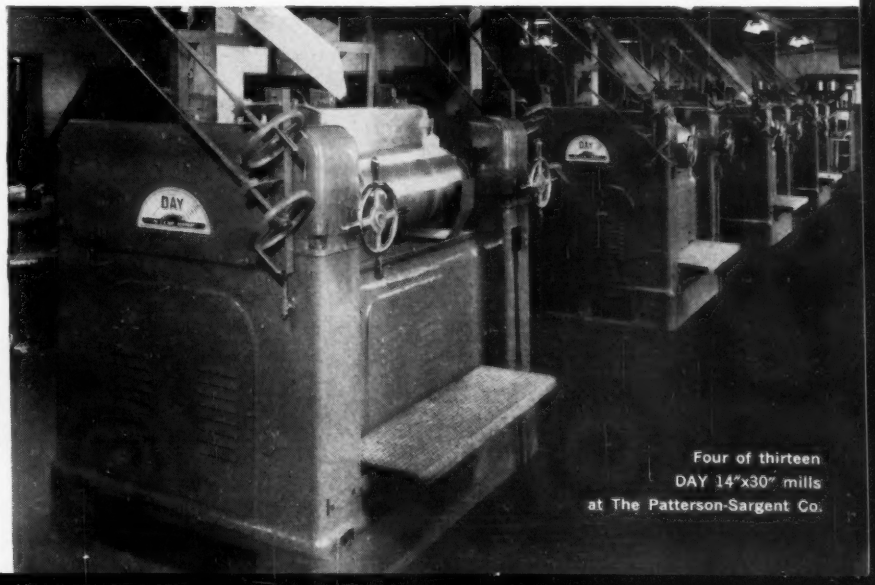
DAY 4"x8" mill for your laboratory



DAY 5"x12" mill for your small batches



DAY 10"x22" mill with lift-type guides



Four of thirteen DAY 14"x30" mills at The Patterson-Sargent Co.

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(b) Silk Screen Printing
(c) Mineral Oil (News)
(d) Oleoresinous
(e) Glycol (Steam Set)
(f) Flexographic
(g) Ball Point
Lubricants
Pharmaceuticals
Polishing Compounds
Protective Coatings:
(a) All trade sales
(b) Industrial primers and coatings
(c) Pigment stains
(d) Colors-in-oil
(e) Wood fillers
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## OPINION

thermal units in the kitchen. The paragraph on page 78 (*May 18*) might have resulted from indirect knowledge that a few Whiting researchers' wives with foreign-language ability are employed as translators at home. . . .

Aside from the misinterpretation of our abstracting procedure, we liked your article pointing up the different trends in handling information and intelligence functions.

J. W. MOHLMAN
Standard Oil Co. (Indiana)
Research Dept.
Whiting Research Laboratory
Whiting, Ind.

# MEETINGS

**Institute of Paper Chemistry;** theme: water-derived problems of the pulp and paper industry; Appleton, Wis., June 16-July 11.

**N. Y. Board of Trade; Drug, Chemical and Allied Trades Section,** Hotel Biltmore, New York, June 18.

**American Society for Engineering Education,** 65th annual meeting, Cornell University, Ithaca, June 17-21.

**Society of Nuclear Medicine,** 4th annual meeting, Skirvin Hotel, Oklahoma City, June 20-23.

**American Assn. of Cost Engineers,** 1st annual meeting, University of New Hampshire, Durham, June 26-29.

**British Plastics Exhibition and Convention,** Olympia London Grand & National Halls, London, July 10-20.

**Denver Research Institute,** Metallurgy Division, 6th annual conference on industrial applications of X-ray analysis, Albany Hotel, Denver, Aug. 7-9.

**American Soybean Assn. and National Soybean Processors Assn.,** annual meeting, Leamington Hotel, Minneapolis, Aug. 26-28.

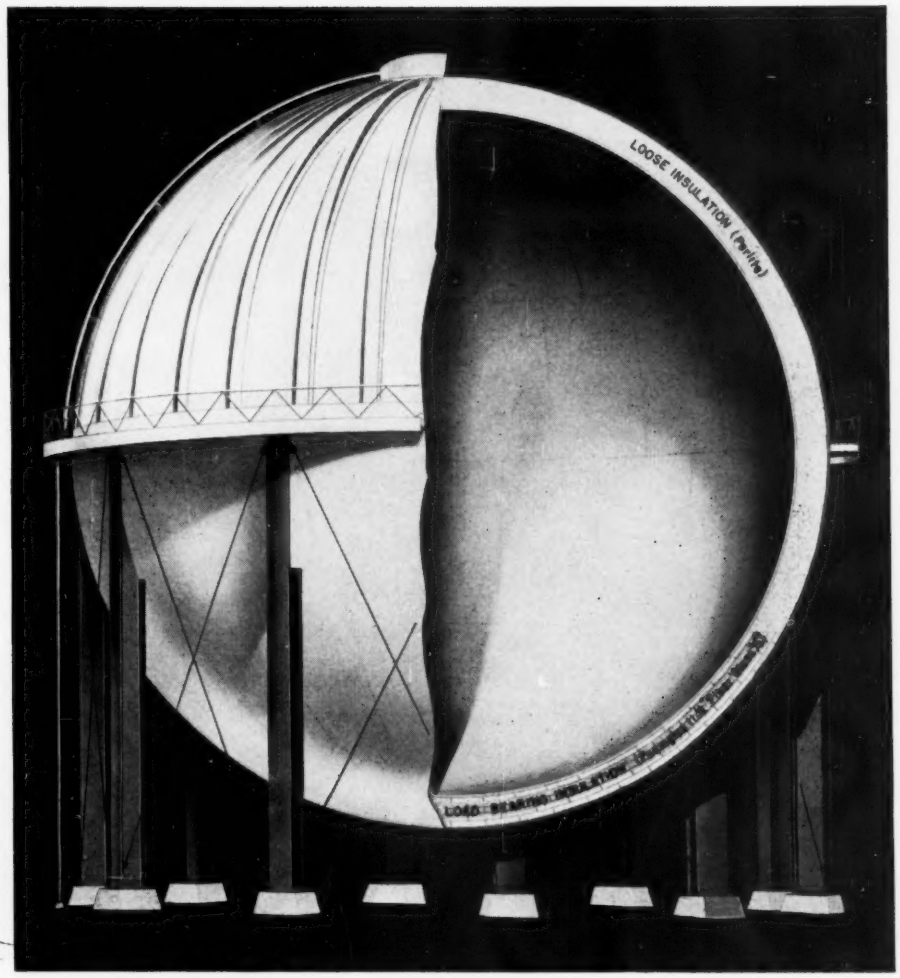
**Fisk University,** 8th annual infrared spectroscopy institute, Nashville, Aug. 26-30.

**Instrument Society of America,** international symposium on gas chromatography, Kellogg Center for Continuing Education, East Lansing, Mich., Aug. 28-30.

**National Agricultural Chemicals Assn.,** annual meeting, Essex and Sussex, Spring Lake, N.J., Sept. 4-6.

**Instrument Society of America,** 12th annual instrument automation conference and exhibit, Cleveland Auditorium, Sept. 9-13.

**Technical Assn. of the Pulp and Paper Industry,** testing conference, Hotel Shoreham, Washington, Sept. 11-13.

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# These two experts can help solve your methyl chloride and methylating problems

Our Messrs. Neuville and Zellner (left to right above) cover all the bases when it comes to methyl chloride application and the special field of methylation. They come by their particular specialties honestly. Since 1936 Ansul has been a constant and expanding source of supply for bulk methyl chloride in the domestic and export markets. In the field of methylation alone (Morrie Neuville's specialty) Ansul has successfully methylated more than 100 compounds.

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For general information about methyl chloride and its bulk application, write to Bob Zellner. Questions or just conversation relating to methylation should be addressed to Morrie Neuville. THE ANSUL CHEMICAL COMPANY, DEPT. C-12, MARINETTE, WISCONSIN.

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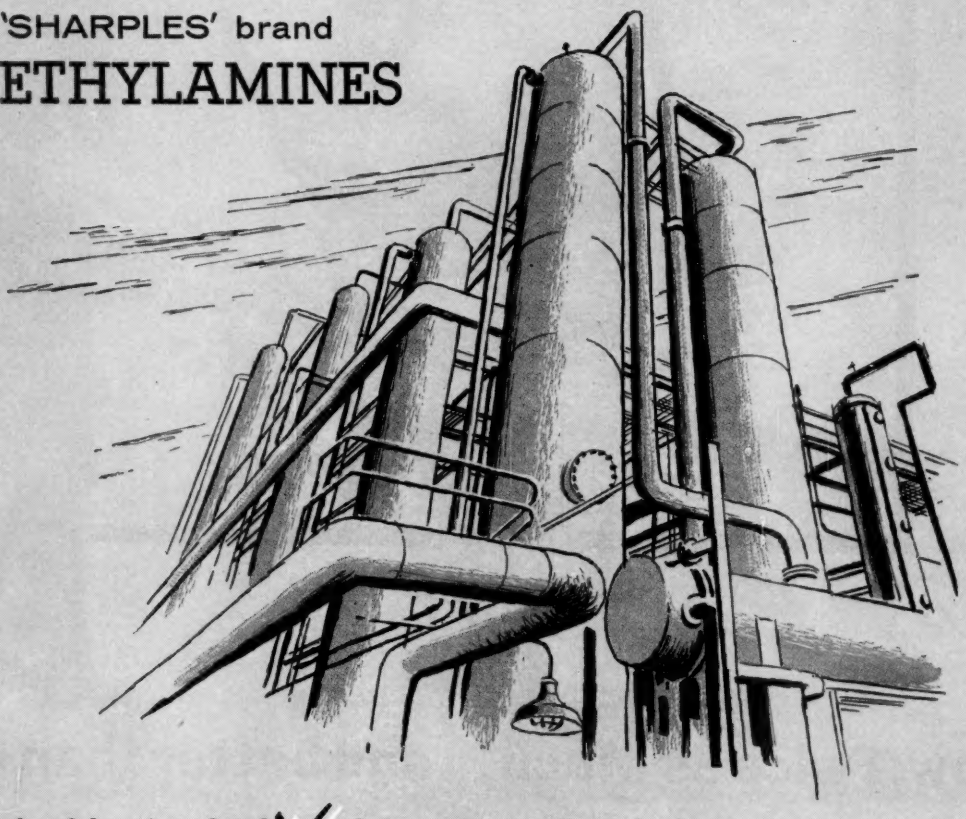
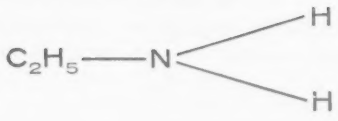
# ETHYLAMINES



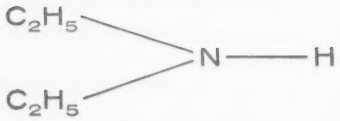
**double checked from research to industry**

## ETHYLAMINE



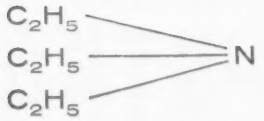
Its many uses include the production of amides, amine salts of sulfonates, modified urea formaldehyde resins and the preparation of salts where improved solubility is desired.

## DIETHYLAMINE



Among its varied uses are the manufacture of agricultural chemicals, emulsifiers, pharmaceuticals, amides, vulcanization accelerators, dyestuffs, surface-active agents.

## TRIETHYLAMINE



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*Assured availability in drums, tank trucks, tank cars.*

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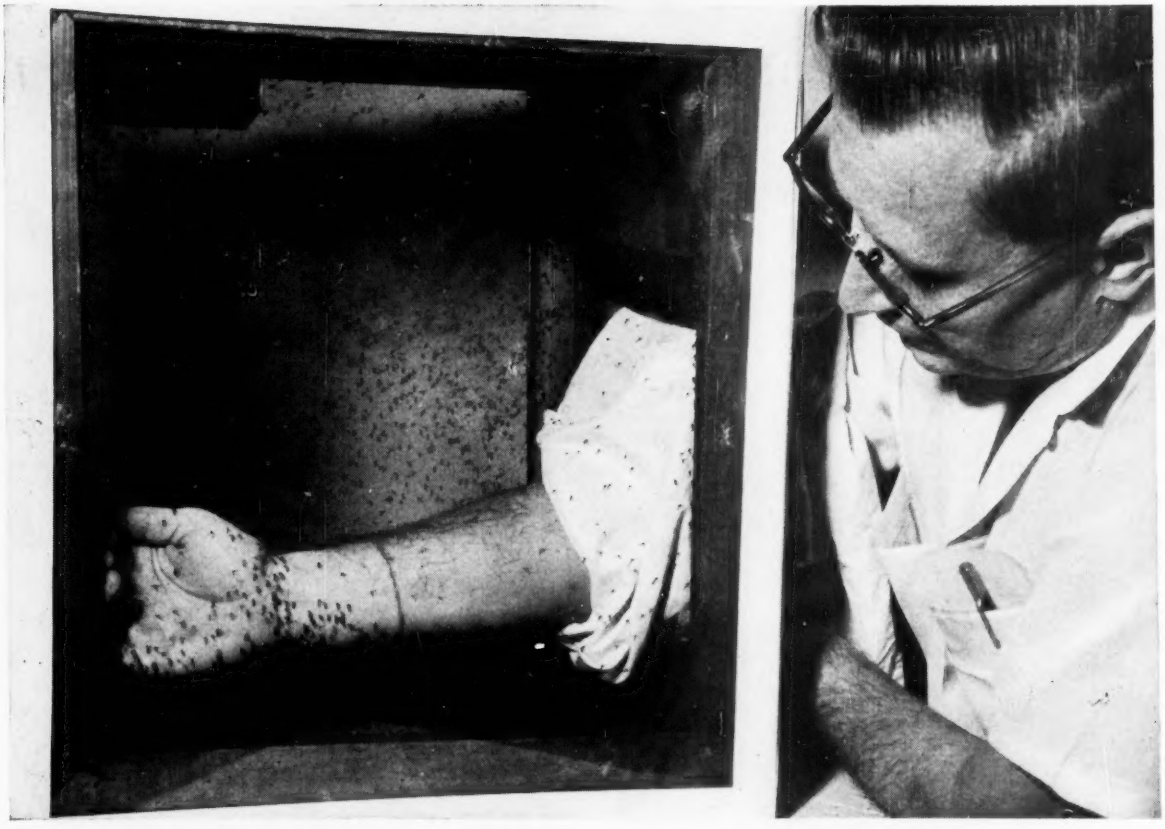
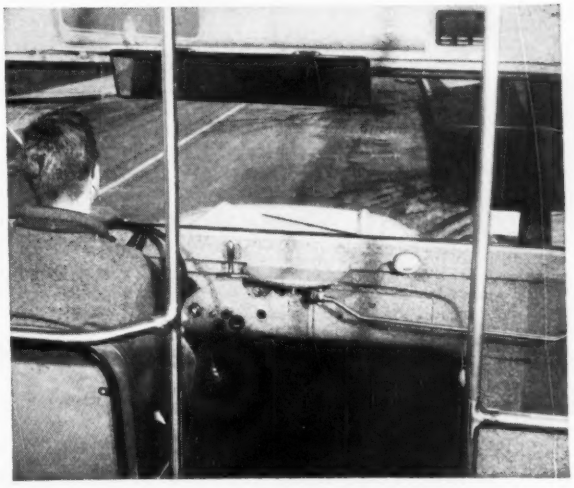


**REPEL INSECTS.** Developed by the USDA, and produced by Hercules, new meta Delphene* has proved itself an unusually effective compound against a wide variety of insects including mosquitoes, biting flies, chiggers, ticks, fleas. The Hercules background in xylene chemistry, plus rigid quality control procedures, yields a repellent with 83% minimum meta isomer content, suitable for a cosmetic chemical. Note how mosquitoes in test cage cling to the glass and shun the man's arm above the black line, while they feast on his untreated wrist and hand—USDA Photo. *Hercules Trademark.



**...MAKE SCHOOL BUSES SAFER.** Multicolor lacquer is used on all interior surfaces of driver's compartment in the new 1957 line of Oneida School Buses, Canastota, N. Y. Its hard, pebbled matte surface cuts out glare from reflected light, makes driving easier and safer. The multicolor lacquer that Oneida uses is made from Hercules® nitrocellulose by The Lowe Bros. Co. under license from Coloramics, Inc. (U. S. Patent No. 2,591,904). The finish is not only nonreflecting but also attractive, durable, and withstands scuffing and scratching. For these reasons it is used throughout the buses on side walls, wheel housings, and heaters.

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Technical Director Ben Zmuda (left) and Purchasing Agent William M. Fitzgerald depend on Wyandotte for dependable quality and prompt service. Wyandotte products used by Reardon include Soda Ash and Carbose.*

# "Wyandotte has a realistic approach to technical service"

Everyone in the building business, and many thousands of home owners, know Bondex—the original, patented, waterproof cement paint made by The Reardon Company, St. Louis, Mo.

Because of the tremendous growth in the use of "sand-finished" products in building, more people buy Bondex and other Reardon products than ever before in its 73-year history. And herein lies a typical American success story that has had a big assist from chemistry.

Read what Reardon's Technical Director, Ben Zmuda, says: "Chemicals play a very important part in the making of our products. They are vital to our future growth and progress. New chemicals, like Wyandotte's Pluronic* series, for example, broaden our base. We are evaluating them as a possible nonionic dispersing agent in solid form.

"Wyandotte has a realistic approach to technical service, too. No magic . . . but down-to-earth co-operation toward getting the maximum benefits from Wyandotte products. This kind of technical service definitely helps get results."

In the words of Purchasing Agent William M. Fitzgerald: "We have enjoyed exceptionally fine business relations with Wyandotte for more than ten years. During this time, Wyandotte representatives have acquired an excellent understanding of our needs and requirements. This is most helpful to us in maintaining high product quality and continuous production in our plants. We know that we can always depend on Wyandotte for prompt delivery, too!"

How about your business? Does your chemical supplier have a good working knowledge of your needs? Perhaps you can profit by calling in the Wyandotte representative and discussing your problems with him. *Wyandotte Chemicals Corporation, Wyandotte, Michigan. Offices in principal cities.*

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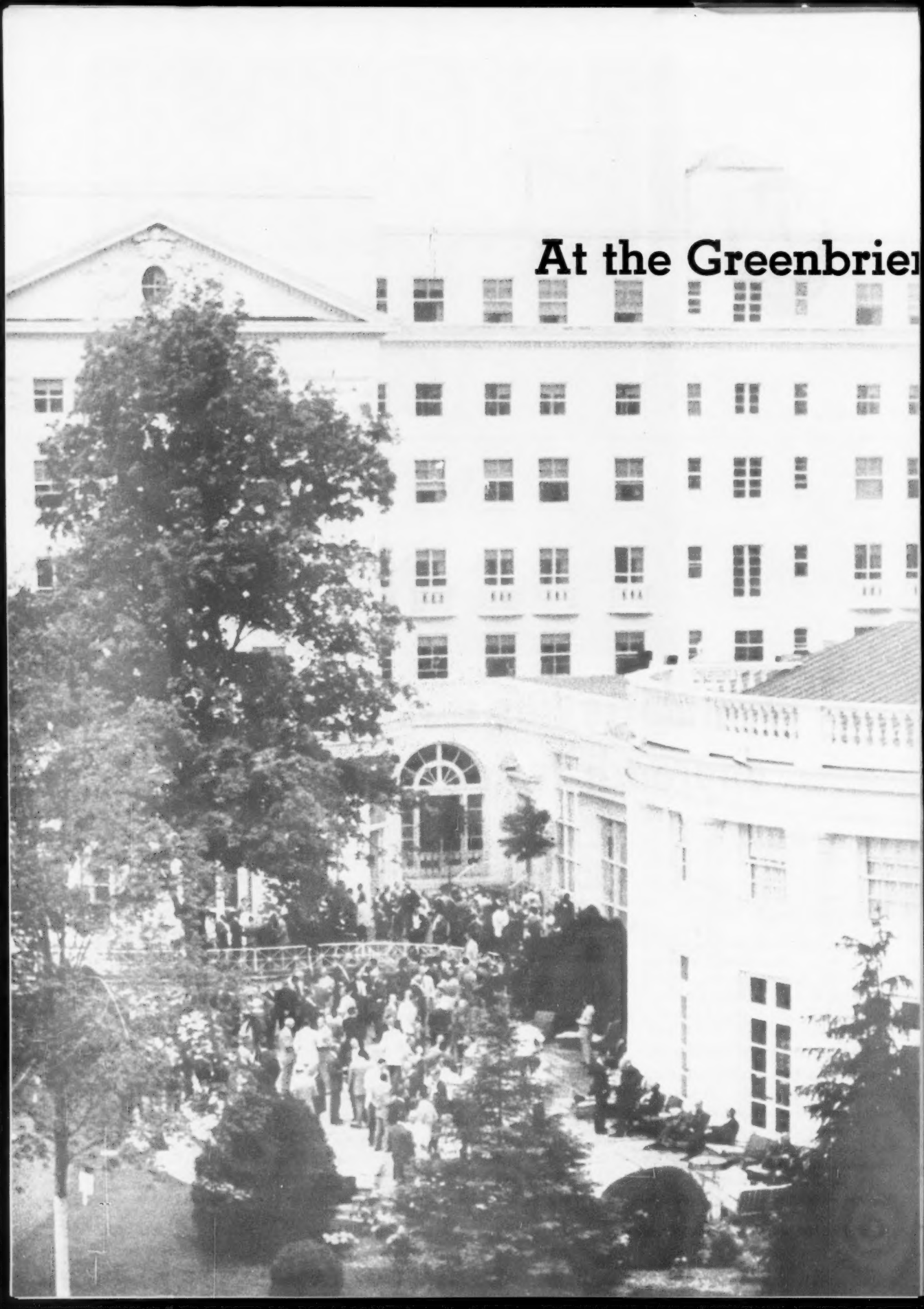

At the Greenbrier

Chemical Week
June 15, 1957 — Vol. 80, No. 24

# MCA Hears Call to Arms

**A new spirit was abroad in the warm, humid air of White Sulphur Springs late last week. There at The Greenbrier, where the Manufacturing Chemists' Assn. convened for its 85th annual meeting, 750 chemical management men were exhorted to shout out management's points of view on current social and economic issues.**

Forthright and hard-hitting, Koppers' President Fred Foy accused management of being too pussilanimous in countering slurs and half-truths printed by union newspapers. He cited his company's study of seven national union publications during the first quarter of this year: they devoted 15% of their space to the union side of controversial questions.

**Management Doesn't Fight:** And what does management do through its company organs? Practically nothing, said Foy. Out of 37 he studied, 34 avoid these questions, and the remainder—for the most part—publish dull and uninspiring essays.

Why doesn't management do more to sell its viewpoint? Because employees "won't read it," say some; if they read it, they "wouldn't believe it," say others; and even if they read and believed it, "they'd resent it," say still others. Foy doesn't buy this; he is convinced that union members want factual information so that they can make up their own minds.

**Profits Are Honorable:** With similar vehemence, Dow Chemical's President Leland Doan called on management to defend the profit motive. "Our first responsibility is profitable operation. That is the simple and perfectly honorable purpose underlying any economic endeavor," he asserted.

The chemical industry—unlike some other industries—may have been laggard in raising prices to protect profit margins. "Steel, oil, paper, glass and aluminum are examples," said Doan, of industries doing better.

**Capital Must Be Protected:** Beyond operating at a profit, management has the additional responsibility of protecting the stockholders' investment. For one thing, it calls for re-examination of depreciation laws, since under inflation a company may recover only 60-70¢ for each dollar of new plant.

For another thing, it calls for maintenance of investment incentives, particularly those for new venture capital. "If you want to face very cold reality, the survival of capitalism as we now know it depends upon making individual investment in the corporate entity worthwhile," said Doan.

Many European industrialists, he said, deplore obsolescence, so they avoid it simply by not developing anything new. "This failure to accept a responsibility for progress probably is a major reason why much of Europe has lagged behind us."

**Tell Your Congressmen:** MCA President John Hull was also in a hortatory mood. After touting the growth of MCA (15 new companies this year; and 141 of the 159 total were represented at the meeting) and reviewing its activities in the fields of safety, education, technical research and public relations, he called upon MCA members to tell—not just yell. "I have noted a reluctance on the part of many to communicate their views to members of Congress," he said.

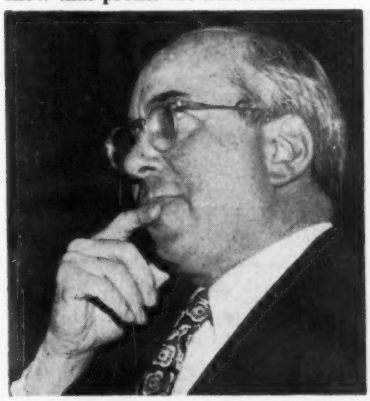
At the banquet Friday evening, AEC Chairman Lewis Strauss also took a mild jab at the industry. "It is somewhat surprising", he said, "to find that your industry has . . . (not been more) aggressive in taking advantage of atomic energy for its own particular benefit."

The business session was, as usual, routine. The budget was approved, the board was expanded (from 27 to 30), and the nominees elected—all with a veritable thicket of raised hands and no discussion. But if the MCA representatives take their speakers' earnest words to heart, there'll be plenty of discussion—and, more important, action—in the months ahead.

**KOPPERS' FOY: Union members want to make up their own minds.**

PAUL BLACKER

**DOW'S DOAN: Management must show that profits are honorable.**



WIDE WORLD

**AEC'S STRAUSS: The industry could be more aggressive.**

WIDE WORLD

**JUDGE LA BUY: In spite of his acquittal of Du Pont, he's got to pass sentence.**

# Aftermath of the Decision

**Few decisions handed down by the U.S. Supreme Court have raised as much heated argument and questioning as last week's antitrust decision against Du Pont.**

The talk divides into three main areas of speculation:

- What courses will Du Pont have to take to provide the relief demanded by the court?
- What is the impact of the decision on companies that are considering or have completed stock acquisition of another firm?
- What is the outlook for increased legislative and antitrust division activity?

As to the course that Du Pont may take, the question is wide open. In the majority opinion, Supreme Court Justice Brennan asserted that Judge Walter La Buy (from whose Chicago courtroom the Justice Dept. appealed his acquittal of Du Pont) "will be clothed with large discretion to model the judgment to fit the exigencies of the case."

Nevertheless, there appear to be several broad avenues down which Du Pont may be able to travel in responding to the government's contention that it must dispose of its 23% holding of General Motors common stock. Most likely, in the minds of many legal observers, is the creation of a form of voting trust for Du Pont's General Motors stock under which Du Pont would be unable to exercise control of GM, but would benefit from the stock income. This move, coupled with removal of Du Pont representatives from the GM board, might go a long way toward satisfying the government.

Still another prospect would be a "spin-off" or direct distribution of Du Pont's GM shares to Du Pont stockholders. This, however, raises the problem of capital gains taxes, which would have to be borne either by Du Pont or its stockholders, a prospect desirable to neither. Chances of this disposition are slim, though, since spin-offs, normally, may not be effected unless the owning company has 80% or better of the stock being distributed.

A third outlet would be direct sale of the GM stock by Du Pont. Again, though, this raises the problem of a vast tax obligation, unless a special dispensation from the Internal Revenue Service could waive these taxes.

**Other Courses:** Even these possibities are not the only ones, however. The question has been raised by many whether there might be some way for Du Pont to get a rehearing of the case; or postpone divestiture by appealing La Buy's decision in the hope that more favorable precedents might be set by the whole Supreme Court based on cases arising in the future. It's thought that Du Pont, as have other companies faced with antitrust settlements, may negotiate an agreement with the Justice Dept. that would satisfy the company, La Buy, and the Attorney General.

But what of other companies—large as well as small—that have acquired stock in other firms? On the face of it, a number of firms fit the basic description of stockholders in customer corporations.

In reality, however, the Du Pont-GM decision appears to set some specific conditions that apply to such stockholdings. To get an idea where their companies stand, chemical management would do well to pose these conditions in relation to the holdings. The conditions:

- The owning company, as a supplier, sells to the company it owns.
- The owned company is a strong factor in its industry—in any section of the country.
- The owning company sells the firm it owns a substantial portion of that company's requirements.

These are some of the conditions surrounding the Du Pont case, and were pointedly used by the Supreme Court. Though they are broad—and the court did little to tightly define them—they may serve as important guideposts in future similar litigation.

As to the future of antitrust activity, there seems little doubt that the Justice Dept. has been handed one of the biggest antitrust sticks—at least from the standpoint of psychologically pressing the department to new goals—since antitrust began in the Teddy Roosevelt era. Whether new cases directly hinging on the Du Pont decision will be won, or additional legislation passed, is a matter that only time will clarify.

It's a sure bet, though, that ramifications of the Du Pont decision will develop for years to come.

# New Laws: Lost in the Rush?

**There are just six weeks left** of this Congressional session, and it looks now as if several laws important to the chemical industry won't be passed. At The Greenbrier last week (*see also p. 34*), MCA President Hull expressed the growing concern for pending legislation.

He pointed out that several vital bills have been on the calendar or in committee for some time. Unfortunately, because of the current budget-cutting furor and defense priorities, Congress has given them brief attention.

**Food Additives:** There are two food additives bills, one by industrial interests and another by the Food & Drug Administration. Both are still before the House Health & Science Subcommittee, where they've been for several weeks.

The bills are important because on their outcome hinges how much authority FDA will have in stopping the sale of additives it believes are toxic. Under the industry-sponsored bill introduced by Rep. Joseph O'Hara (R., Minn.), FDA could stop the sale by a court order. But under its own bill, FDA could stop sale without going to court.

Another controversy centers around the so-called "grandfather clause." This paragraph, included in the FDA bill, would give the Administration authority to recall for toxicity tests any additive now on the market. Industry wants a blanket exemption on all existing additives, wants only new ones subject to FDA testing.

As yet, no hearings are scheduled by the House Subcommittee. But even if hearings were to take place soon, no actual legislation is expected before Congress adjourns.

**Atomic Energy:** Also pending is a bill to amend the Atomic Energy Act of 1954 to give government insurance to persons working in the atomic energy program. Purpose is to encourage private industry to share in the program by eliminating one of the most powerful deterrents, liability for the public or workers injured by reactor accidents.

While the bill was reported on favorably by the Joint Committee on Atomic Energy, it has run into some potent opposition in the House, chiefly on grounds that it would be too expensive. Now it's given little chance to pass during this session.

**Antidumping Controversy:** There are three antidumping bills—two by "protectionists" and one by the Treasury Dept. Main points of issue are whether importers are lowering their prices in this country to meet competition or if they're actually underselling American producers. What must be ironed out is whether dumping includes every case where a manufacturer sells his product in the U.S. for less than he sells it in a foreign country. Also needing clarification: whether lowered import prices are injuring American producers or just stimulating competition. Sharp & Bogan, Washington legal firm representing several import trade associations, is now drawing up a bill liberalizing the definitions of "dumping" and "injury," hoping to make it more palatable for importers. However, this or any version of the other three bills stands little chance of becoming a law during this session.

**Antimonopoly Bill:** S-11, being of such a controversial nature (*CW June 1, '57, p. 23*), is not likely to get any final action this session. No hearings have been scheduled; and with only about six weeks remaining, the bill is a strong candidate to get lost in the last-minute rush.

**Fast Tax Write-off:** Standing a little better chance of seeing action this session is Sen. Harry Byrd's (D., Va.) fast tax write-off bill. Essentially, this bill would deny fast tax write-offs to any firm unless the firm is directly connected with a most essential defense activity. Of course, industry is opposed. There seems little doubt that the bill can be defeated, with people like ultraconservative Senator Byrd as well as Eisenhower supporting it.

**OTC:** Another piece of legislation that could have a big effect on U.S. industry is a bill proposing that the U.S. become a member of the Office for Trade Cooperation. OTC would enforce the general agreement on tariffs, would set up the machinery for settling claims and violations.

Right now, the bill is hung up in the House Ways & Means Committee. With no hearings yet scheduled, it has little chance of passing this session.

WIDE WORLD

**JUDGE KNOUS: For two firms, ultimate vindication.**

## No Vanadium Guilt

**At the end of an eight-day trial in Denver, a U. S. district court jury, last week cleared Union Carbide Corp. and Vanadium Corp. of America of price-fixing and conspiracy.**

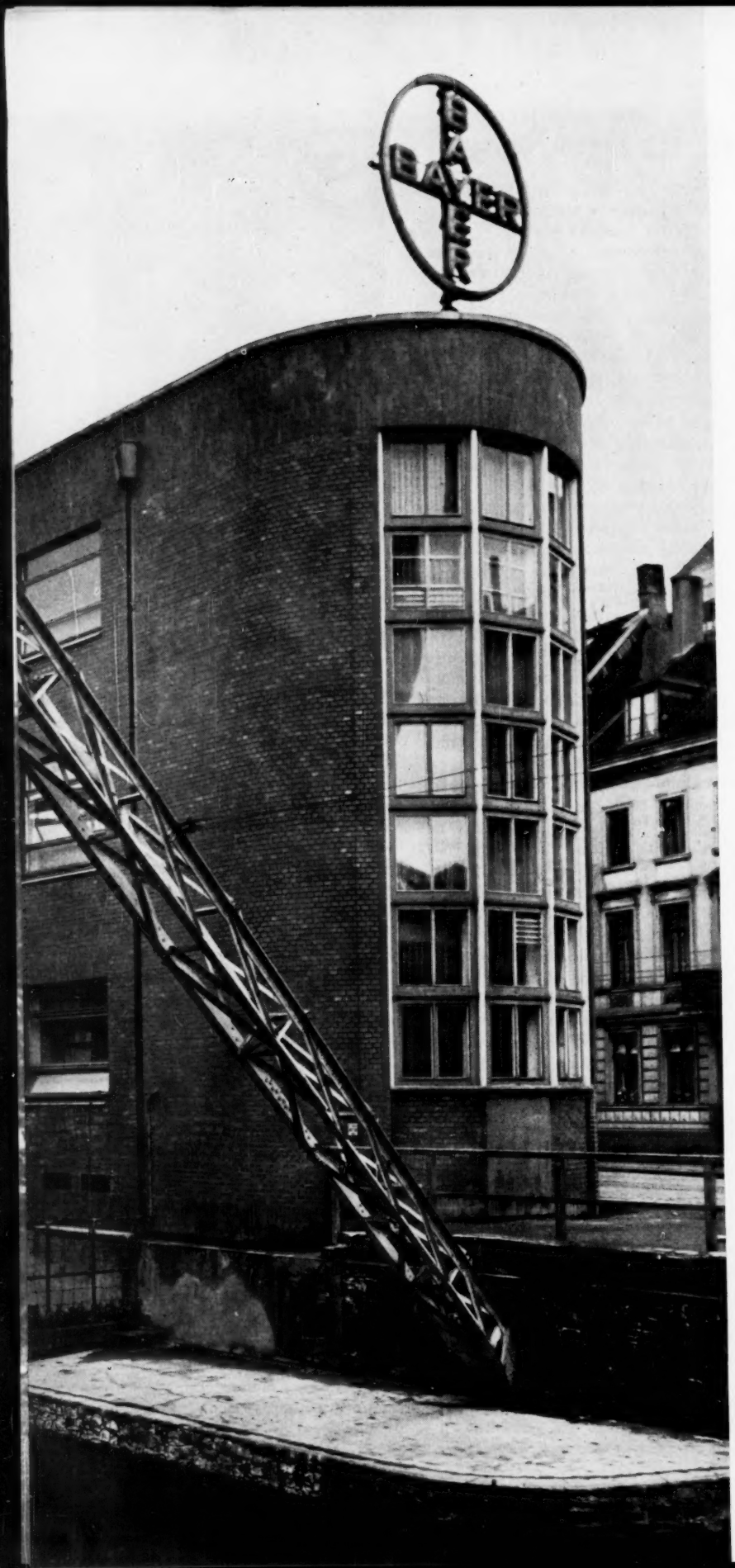
The two companies had been accused by the government of conspiring between 1933 and 1946 to monopolize vanadium markets. In addition, Continental Ore Co. (New York) has been seeking $1.5 million in treble damages from the two, charging that they restrained it from entering the vanadium business in the 1930s.

In a previous trial of the case, a jury was unable to reach a decision and a retrial was ordered (*CW, Feb. 9, p. 22*). Now, a jury of seven women and five men has returned a verdict of not guilty, to Judge Lee Knous.

Results of the antitrust trial were expected to have a significant bearing on Continental Ore's damage suit. Now, however, the company's charges of restraint of trade against the two firms have been apparently weakened by the jury's decision.

A Continental spokesman could give no indication of his company's plans in the light of the new decision.

Continental says it had purchased an old vanadium mill at Gateway, Colo., to process the material. But Henry Leir, Continental president, claims he was unable to buy vanadium supplies from UCC, its subsidiaries, and from Vanadium Corp.




# Bayer Cross

**Stockholders of Farbenfabriken Bayer recently approved a proposal to enlarge the company's authorized capital stock by 36.3% to $178.5 million, an increase not much less than the firm's capital growth (from $92 million to $131 million) during the past three years. The new capital will be used to strengthen the grip on American markets of the biggest of the I. G. Farben splinters.**

Bayer President Ulrich Haberland says Bayer interests in North and South America will require at least $25 million within the next three years.

**More of Same:** Bayer's resurgence to world eminence since the disintegration of the I. G. Farben empire of World War II days has been as equally strong in foreign quarters as in Germany. Particularly it's being felt on the American continents.

Bayer participation in ventures in the U.S. has grown by leaps and bounds. Today the company can claim 50% ownership of Mobay Chemicals with Monsanto, 50% of Chemagro Corp.—up from last year's 33%—with Pittsburgh Coke & Chemical, a substantial chunk of Verona Chemical Co. (which owns 100% of Pharma Chemical Corp.) and Verona Dyestuffs, and complete control of Vero Beach Laboratories, Inc., in Florida.

Moreover, the company has a number of working agreements with U.S. firms, among them Goodyear, General Tire & Rubber, B. F. Goodrich, and Schenley Laboratories. It has purchased the Agfa photo trademark from General Aniline & Film, and has a power and raw material supply agreement with Titan Co. of Wilmington, Del. In addition it's hoping to get back at least partial use of the Bayer trademark from Sterling Drug.

**Bayer's pharmaceutical research labs at Elberfeld, home of one of the company's four main plants.**

# Looms Larger over Americas

**South America, Too:** But Bayer's steady move westward hasn't been confined to the U.S. In Mexico, the firm will build a plant to make pesticides and dyestuffs; a similar plant is operated in Brazil by a subsidiary, Bayer do Brasil Industrias Quimicas SA. Another Brazilian subsidiary, Chimica Bayer, Ltd., will begin pharmaceutical production next year. In Argentina, Bayer has established or bought into two firms; in Chile, one.

**No Accident:** Bayer's return to the American scene has been no accident. Says Haberland: the move is intended "(to) strengthen our friendly cooperation with the American chemical industry, and exchange scientific and technical experience."

But firm intentions are not Bayer's only assets for doing business in the Americas. Bayer is strong financially. In illustrating the need for investment capital, Haberland points out that the company's business volume has grown fourfold since 1949 with a commensurate investment of $241.3 million.

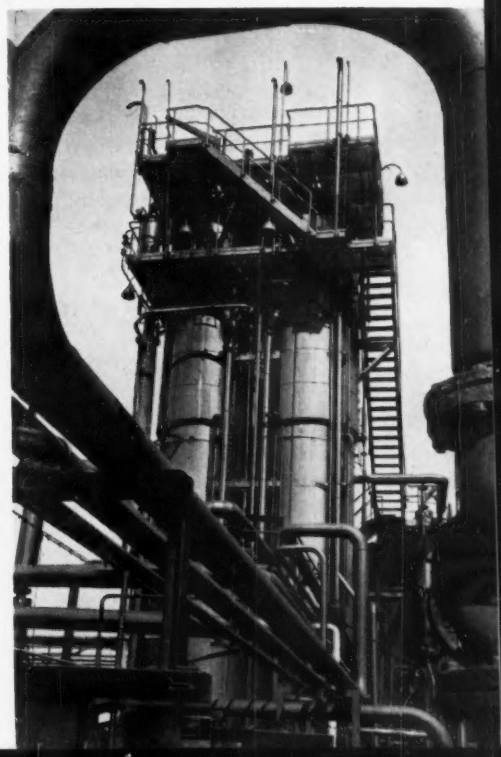
Sales in 1956, says Haberland, increased by $37.6 million largely because new products worth some $90.5 million outshone the firm's older line sales of $52.4 million. In addition to presently operating investments in newer products, Bayer is sinking $107 million in new plants, plans to put $178.5-$190 million in proposed plants between 1957 and '59. Better than 10% of this will be in the foreign ventures.

**Many from Few:** Bayer's philosophy, unlike that of the vast portion of West Germany's chemical companies, is to turn out a wide variety of chemicals made from a small and inexpensive group of raw materials. Basis of this is the fact that raw material costs in Germany are some four times higher, on the average, than they are in the U.S.

Thus Bayer moves into the country some 2 million tons of raw material every year—mainly by barging it up the Rhine River. And from this, about 1 million tons of finished products move out to 50,000 customers the world over. The products pour in a steady stream from the four big plants at Leverkusen, Uerdingen, Elberfeld (*photo, opposite page*) and Dormagen, where Bayer will build a new ethylene plant (*CW Business Newsletter, June 8*), and from its other operations.

The giant Bayer complex—which invests 5% of sales in research and whose $380 million sales (14,125 products) last year accounted for 10% of total German chemical sales (and 16% of German chemical exports)—is committed to grow further. The 1957 sales forecast: $476 million. And American chemical management can be sure an increasing portion of the gain will be in American chemical markets.

**Bayer's foreign sales account for 16% of total '56 exports of the German chemical industry.**



## EXPANSION

**Petroleum Products:** Cabot Carbon Co. will build a $1-million gasoline plant in Lea County, Tex., with initial capacity for producing 3.5 million cu. ft. of gas daily. Plans call for eventual expansion to 6 million cu. ft./day. The plant is expected to be completed before the end of the year.

•

**Lime Flux:** U. S. Lime Products Corp. (subsidiary of Flintkote Co.) will build a 400-tons/day lime products plant at Arrolime, Nev., 20 miles northwest of Las Vegas. A large portion of production will go to Kaiser Steel Corp. plant at Fontana, Calif.

•

**Liquid Oxygen:** Big Three Welding Supply Co. (Dallas, Tex.) is building a liquid-oxygen plant near Dallas to produce 30 tons/day of liquid oxygen or nitrogen and 20,000 cu. ft./day of argon. The materials are intended to meet all military specifications.

•

**Sensitized Materials:** General Aniline & Film Corp. will build a $1-million sensitized materials plant at La Habra, Calif. (near Los Angeles) for its Ozalid Division. Construction is expected to be completed in about a year. Ozalid has also started construction of an equipment-making plant at Vestal, N. Y.

•

**Pulp and Paper:** St. Malo Pulp and Paper Corp., a newly formed company sponsored by U. S. and Canadian interests, will build a $3-million pulp mill in Quebec City, Que. Capacity: 100 tons/day.

•

**Uranium:** Cotter Corp. ( Santa Fe, N. M.) will build a 50-100-tons/day uranium processing pilot plant at Canon City, Colo., under terms of a contract recently signed with the Atomic Energy Commission. The mill will use ores from the Front Range deposits that are now being shipped to Vitro Corp.'s mill near Salt Lake City. Onstream date: Dec. '57.

•

**Furfural:** Cumberland Corp. has completed a $3-million wood distillation plant at Burnside, Ky., to manufacture charcoal and other products. At full capacity the plant will produce furfural.

## COMPANIES

**S.B. Penick & Co.** has acquired the Aromatic Chemicals Compounding Dept. of Dow Chemical Co. and will make and sell all aromatic blends formerly made by Dow. Dow expects to continue making and developing aromatic chemicals. Terms were not disclosed.

•

**Canadian Celanese Ltd.** has acquired the machinery, process, materials, know-how and tradenames of Rayflex Co. of Canada Ltd., a subsidiary of Rayflex Inc., a U.S. firm. Canadian Celanese will produce rubber products under license from the U.S. Rayflex.

•

**Dow Chemical of Canada** has purchased 400 acres at Sarnia, Ont., as a possible site for anticipated future expansion. No immediate construction is planned. The property is near Dow's petrochemical plants in the area.

•

**Olin Mathieson Chemical Corp.** has optioned 200 acres near Montville, Conn., as one of several sites under consideration for a proposed nuclear reactor core assembly plant.

•

**Virginia-Carolina Chemical Corp.** hopes to have ready a recapitalization plan to present to stockholders at its annual meeting in September.

At the end of March, V-C had 508,872 common shares outstanding and 213,052 preferred shares ($100 par, 6% cumulative participating) with dividend arrearages of $73.50/share on the preferred stock. Allied Chemical & Dye owns 20% of the preferred shares.

•

**American Metals Co. Ltd.** may obtain a 60% interest in a lithium mine to be developed by Montgary Explorations Ltd. (Toronto) (*CW, June 1, p. 27*). The option agreement, ratified by Montgary stockholders, would give American Metals the right to examine the lithium ore body and participate in development of the mine, flotation concentrator, and marketing of spodumene concentrates. If American Metals exercises the option by next Nov. 1, the firms will form a new company.

## FOREIGN

**Antibiotics/Argentina:** Lepetit S. A., the Argentine subsidiary of the Italian pharmaceutical house Ledoga Lepetit, plans to begin export of antibiotics and other drugs to other Latin American countries this year. Lepetit turns out the widest variety of antibiotics in Argentina.

•

**Synthetic Rubber/Italy:** ANIC (Milan, Italy), a subsidiary of the state-owned Ente Nazionale Idrocarburi, will increase capacity of its abuilding synthetic rubber plant. The facility, at Ravenna, was originally designed to produce 35,000 metric tons/year of GR-S synthetic rubber plus some nitrogen fertilizers. The GR-S capacity will be increased to 55,000 metric tons/year.

•

**Vanadium/South Africa:** Two U.S. firms, Minerals Engineering Co. and Rockefeller Center, Inc., will join with an English firm, High Speed Steel Alloys, Ltd., to build a vanadium mill in the Transvaal, Union of South Africa. Capacity: 3.6 million lbs. of vanadium concentrate annually. Completion date: early September.

FOOD TOPICS

**IN TOILETRY merchandising, the rack jobber is proving he can be . . .**

# Supermarket 'Super' Seller

**There's almost a 50-50 chance** that the health and beauty items assembled in the food market above for this weekend's Father's Day selling were put there by a type of wholesaler gaining increasing prominence in the U.S. —the rack jobber. Currently handling $350 million worth, or some 42% of health and beauty (H&B) specialties sold in food stores, "rack jobbers*" will likely boost their share of toiletry merchandising to more than 50% of the food store totals by 1960.

By that time, estimates the Toiletry Merchandisers Assn., some $650 million worth of health and beauty products will move through this middleman.

**Decade's Growth:** Only about 20 years on the U.S. retailing scene, the rack jobbers have grown tremendously in the last decade, picked up 80% of their business in that time. They got their start, according to some authorities, during World War II, when food market managers found themselves staring at empty shelf space. Unable to get many food items, retailers invited certain nonfood sellers to display some of their products.

And since that time, food dealers, delighted by profit margins that are often twice those on food products, have retained the services of these merchandisers. But the advent of the rack jobber hasn't been universally welcomed. Some manufacturers, for example, are reluctant to sell the rack jobber for fear they will jeopardize relationships with their traditional distribution channels (which has been the case to some extent, *see box, p. 42*).

**What He Does:** Just what a rack jobber is, what he does for the retailer and how many of them there are could be legitimately answered by either of two groups: the American Rack Merchandisers Institute (Chicago) or the Toiletry Merchandisers Assn. (New York). For chemical specialties makers, TMA is properly the one to reply, since its members predominantly sell beauty and health aids, while ARMI chiefly sells housewares.

Toiletry merchandisers number about 350† in the U.S. today. (About 124 of these are TMA members doing 75% of the H&B business.) These merchandisers service about 20,000 of the total 27,000 supermarkets (stores that do annual volume of $375,000), 50,000 of the total of 65,000 superettes (stores doing between $75,000 and $375,000 yearly).

Only a very few of the 218,000 small stores, which do only 9% of the $42 billion in food sales annually are serviced by merchandisers. The supermarkets, with their 62% of sales, and the superettes, with 29%, are the only ones providing the type of traffic needed to make the services of a toiletry merchandiser pay.

**Everything But:** Here's what the rack jobber does for the food store:

- Sets up the display on the shelves allotted to him (he often pays for the shelf construction himself).
- Sets the price of the merchandise (almost always in line with "fair trade" pricing).
- Controls allotment of space for each item, and decides which items shall go on the shelf.
- Warehouses the goods and delivers them.
- Guarantees sale of all merchandise and picks up all damaged, unseasonable and obsolete merchandise.
- Maintains the shelves, sets up all point-of-purchase displays, and con-

*By 1960, the trade hopes it will have moved away from the rack jobber label to something more descriptive of their service—and also more euphonious. Possibilities: service merchandiser or service distributor.

†Some of the big toiletry merchandisers in the U.S.: Handleman Drug (Detroit), probably the largest; Rawson Wholesale Drug (Oakland Calif); A Robinson Co. (Pittsburgh); Yeager Wholesale Co. (Tulsa, Okla.); Leslie Sales (Boston); and—supposedly the oldest of the bunch—Handy Spot Co. (Los Angeles and San Francisco).

## How Some Druggists Meet Rack Jobber Competition

**Admitting that nonfood sales in supermarkets had cut deeply into sales of beauty and health items in drugstores, one druggist gave *CW* this picture of his reaction to that competition:**

**"As a defensive measure, we try to cooperate with those manufacturers that don't try to peddle their goods to just anyone who'll take them, who want customers that will try to preserve the price structure of their product after it leaves their hands.**

**"Those manufacturers whose products get prominence in the food markets can forget about getting special displays from us. We'll carry their brands but won't push them. Companies that stick with us can expect us to give them a favored spot.**

**"We're at a real disadvantage on some items. A rack jobber will stock four or five brands of toothpaste, whereas we'll carry 20, and he'll be able to show the manufacturer some really impressive movement. The result is usually some sort of rebate disguised as an advertising allowance. . . . We get some benefit out of people not being able to find the product they want in the food market, but it doesn't anywhere near even the score."**

trols and services cooperative advertising.

About all the merchandiser doesn't do is collect the cash for the items. Here's how the revenue is split: the store owner gets 25-31% of the dollar; the jobber about 10%; the manufacturer gets the rest.

The rack jobber admits the store owner could make more by buying direct, but points out that a food expert can't be expected to know what items are "hot" sellers in the health and beauty field—noted for the fickleness of its consumers.

This stress on specialized selling has been seconded by the food seller. Almost all the big supermarkets, including Safeway, Kroger, National and A&P, utilize the services of a rack jobber.

Some of them have used the jobber for what they thought was a "just to get started" period, and then returned to direct buying. But most of them went back to the rack jobber when they saw profits fade. And the profits are impressive in most cases. Compared with a food item, an H&B item will return twice the profit.

A case in point is one supermarket chain that refused to use trading stamps, tried to beat competition with lower prices. To do this, and make up the loss on its food-line margins, the chain had to increase its percentage of nonfood items.

**Division of Displays:** If you look on the average food-store shelf serviced by a rack jobber, you'll probably find this breakdown of product space allotment (space allotted according to money an item brings): toothpastes, 18%; shampoos (all types), 14%; headache remedies, 10%; deodorants, 5%; first-aid items, 4%.

An interesting difference between the rack jobber and other product-pushers in the food market is the jobber's comparatively mild demands for more space. Although most of them would like to have more, they figure that by grabbing too much space they would cut down on size of the food sections—and it's the food that brings the traffic into the store, giving the toiletries a chance to make their impulse appeal.

There's no rigid formula about how much of the total floor space health and beauty items should take. One rule of thumb: 5 ft. of H&B products for every checkout lane (less space is figured in states having restrictive legislation on some health items).

**Who's Hurting?** Naturally, with the terrific increase in business that nonfood items have enjoyed, dealers have suffered. Chief case in point: the druggist.

To him the rack jobber points out that it was the drugstore that helped kill the confectionary and tobacco stores, get the mixed selling started in the first place. One merchandiser told *CW* that helping to cripple the druggist as an outlet was the wholesale druggist, who—while declaiming against rack jobbers at the front door—was shipping goods to them out the back. "We had to have the big names," said this merchandiser, "and we 'bootlegged' through the wholesale druggist."

Most probably, department stores will feel the competition next. Already, department stores have lost some toiletries and housewares business to supermarkets, and stand to lose more.

**Jobber's Future:** Edward Walther, partner in New York's Management Development Associates, who has made a study of rack jobbers, told *CW*:

"If I were a manufacturer who sells products in the beauty and health field, or a retail druggist, I would take a hard look at what is going on. I would take another hard look—this time at myself—seeking a way to use this changing pattern as a test of my own ability to adapt. Rack jobbing is one kind of merchandising change that is still going on, one whose full impact has not yet been recognized."

# where the need is Critical

THERE are some fields of industry, some professions, where more than ordinary care is required. Food is one, medicine another, chemical research a third. Here purity in its truest sense must be enveloped with meticulous care every step of the way.

Relatively minor elements of equipment often play a vital part. For example, if the tubing used to transport liquid food should be attacked by one of the food chemicals trouble could be serious; a life could be endangered if the wrong tubing were used to convey blood or blood plasma; a research project could fail if contaminants leached out to spoil a solution.

This is why those whose job it is to safeguard purity specify Tygon Tubing for critical tasks. This flexible, plastic tubing, crystal clear, flexible as a piece of string, tough as leather, resistant to acids and alkalies, offers a combination of properties found in no other material.

And like metal alloys, basic properties of this unique "flexible glass" plastic tubing can be varied to meet a wide range of special requirements. Thus, Tygon Tubing is made in many standard formulations and in innumerable special ones.

That is why those whose job it is to safeguard purity specify the specific formulation of Tygon Tubing designed to fit their exact needs . . . *for they know, as do we, that no single formulation can do all things well.*

Tygon plastic Tubing is made in many formulations, each designed for a specific usage . . . and in over 60 sizes, from ⅛" to 3" I.D. Write for Bulletin T-97.

PLASTICS & SYNTHETICS DIVISION

**U. S. STONEWARE**

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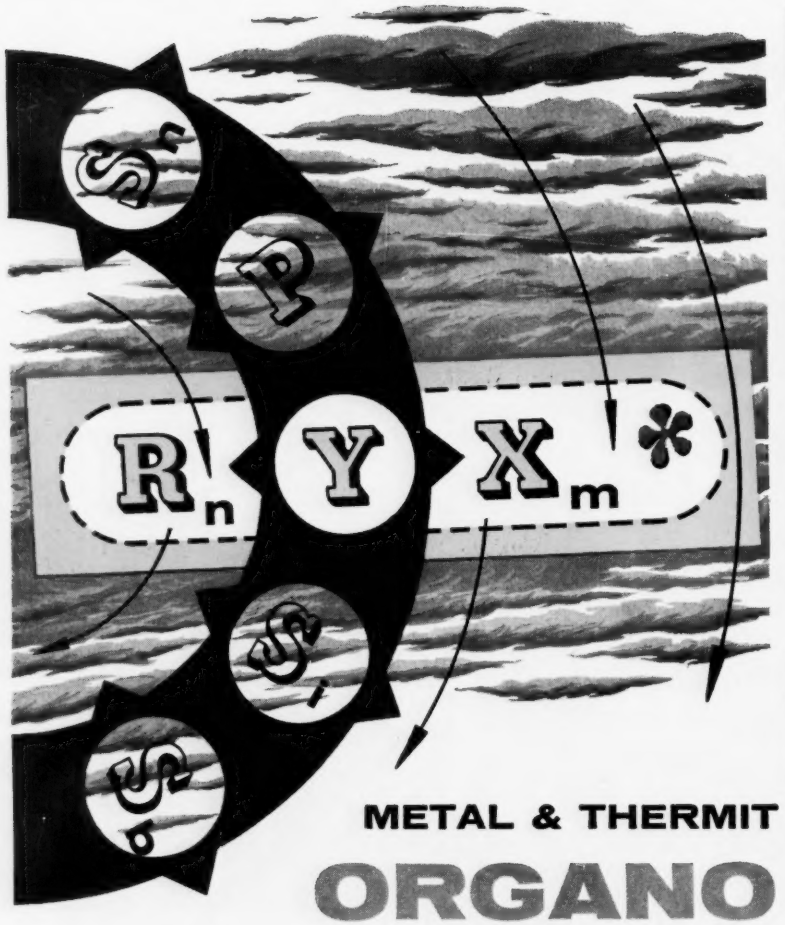


METAL & THERMIT

ORGANO METALLICS

*$R_nYX_m$—In this formula R may be alkyl or aryl; Y represents the metallic element, and X an electronegative group such as halogen, oxygen in substituted groups of the alkoxide, acid radical or hydroxide type, or electronegative sulfur-containing groups. n+m must equal valence of Y.

Metal & Thermit has developed a greater variety of organo-metallics for commercial use than any other single company. The world's foremost producer of organotins, Metal & Thermit now offers an expanded line of compounds including those of phosphorous, antimony and silicon. A unique plant devoted exclusively to the production of these organo-metallics is in full operation in New Jersey. Scheduled for early 1958 completion is an even larger organo-metallic plant near the new chemical production center at Carrollton, Kentucky. Backing the entire expansion program is the Metal & Thermit research organization which includes personnel experienced in developing organo-metallics from all metals investigated to date.

*Inquiries on organo-metallic compounds of tin, antimony, phosphorous, silicon or other metals will receive our prompt attention.*

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## New Blaster

**Canadian Industries Ltd.** has developed a new form of blasting agent. It can be mixed on the job, is said to cost less and be safer to transport and handle than currently popular dynamite forms.

The explosive consists of ammonium nitrate, which is mixed with ordinary fuel oil and set off by a primer stick. The ammonium nitrate is manufactured in prilled form and packaged in multiwall 80-lb. paper bags. It is usually mixed with the fuel oil right in the boreholes.

Principal uses now visualized include open mine pits and quarries, other blasting sites where large mechanical equipment is available to dig the shot. Also needed: rock formation that is not too hard to break, is fairly dry.

## One-Shot Adhesive

**To meet fine weight standards** involved in making aircraft gyroscopes, Bacon Industries, Inc. (Watertown, Mass.), is offering adhesive in preweighed amounts. The small one-shot packages (mix, use, throw away) contain small quantities of both FA-1 and LCA-1 adhesives and activator, weigh within 3% of the amount needed. The activator is in a sealed glass ampule. The container for the adhesive is large enough to be used for mixing the two.

## Squeeze and Roll

**Lehn & Fink Products Co.** (New York) is bringing out two new deodorants packaged in squeeze bottles with "ball-point" dispenser heads. Already in the stores is Etiquet's Rolit, a lotion deodorant. Soon to follow will be a similar product from the Tussy Products Division, to be called Roto-Magic Action.

Economy will be a big part of the pitch for the first product, Rolit. In a 1½-oz. package, it will sell for 69¢, as opposed to Bristol-Myers' Ban, first of the ball-dispenser deodorants, which sells at $1/oz. Other ball-point products, also more expensive than Rolit, are Pharma-Craft Corp.'s (Batavia, Ill.) Fresh ($1/oz.); Carter Products Inc.'s (New York) Arrid (69¢ for 1/oz.); Rolit's upcoming sister, Roto-Magic Action ($1/1½ oz.).

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**INSECTICIDES UP: New to CSMA survey, fog sprays upped latest figures. But they could hurt future sales.**

# Insecticides Sales Soar to New Mark

**There's mixed reaction** to the Chemical Specialties Manufacturers Assn.'s *(CW, June 8, p. 98)* latest survey of insecticide sales. On the positive side, the new survey sets a mark for thoroughness—a record 173 firms volunteered information for the study of '56 sales, against only 118 last year.

But the boosted coverage creates a difficulty in making comparisons between '55 and '56 surveys. Example: although some insecticide makers feel that '56 was a relatively poor year, the figures show liquid insecticides sales rose 38% over '55's mark.

But comparisons aren't possible, anyway, for new categories of products—e.g., area fog sprays, with '56 sales of 2,366,533 gal. in programs such as the current state-federal campaign to eliminate the gypsy moth in the eastern U. S.

Besides, the different number of respondents in '55 and '56 doesn't completely invalidate comparisons of the relative market position of various insecticide forms, nor does it detract from the significance of sales drops.

**Dropped Package**: The most significant shift to show up is probably the shift away from packaged chlordane and dieldrin sprays, which were down 24% from 1955's 3,520,297 gal. Much of this was picked up by the packaged DDT residual sprays, up an apparent 27%, to 2,489,177 gal.

Space sprays appear to have gained faster than any other insecticide, and account for about a quarter of all liquid sales with 4,188,304 gal. (compared with 1,797,515 gal. in '55).

**Other Ups:** Fabric pest sprays had a 10-fold rise. Although sales of the packaged sizes dropped from 131,577 gal. to 84,686 last year, sale of bulk sizes increased from 23,533 gal. in '55 to 1,619,460 gal. in '56. One reason was the burst of advertising to make moth-proofing more or less a standard part of a dry-cleaning job (which also, of course, accounts for the lower sales of home-sizes).

Gallonage of nonemulsion concentrates reached 124,254 gal. in 1956 (131% over '55's mark). Also up, but less sharply, were oil-base livestock sprays, with sales of 1,800,593 gal., which represents a 4% rise (small package sales declined slightly, but bulk sales were up 11%). Emulsion concentrates other than livestock insecticides and vaporizer chemicals (for automotive use) also had bigger sales.

**And Downs**: Livestock emulsion concentrates sales were down 46.6%, to 189,148 gal.

Also on the decline were livestock wettable powders, which have dropped each year since '53 to touch 1,394,000 lbs. last year. Cattle smears and other screw-worm remedies were down 7.5%, to 252,436 units.

The total number of insecticide packages sold continued their steady rise since '53, however. In '56, 57,982,280 packages of all types of household and industrial insecticide were sold, compared with '55's 44,717,343; '54's 42,668,581; and '53's 38,883,152.

Insecticide makers differ in their optimism as expressed in reaction to the survey. Many are worried about what they consider an unhealthily large carryover of inventory, anticipate a bad insecticide year in '57. Most, while admitting that supplies do seem to be backed up all the way to the formulator level, say this is caused only by a late-starting season. They expect orders to rush in soon, and for the season to end up like '50, a fairly good year.

One spokesman said the government

TOMORROW'S PRODUCTS TODAY...THROUGH ENJAY PETROCHEMICALS

# Basic raw materials for VINYLS that can take tough treatment!

Decorative vinyl wall covering and vinyl floor tiles are fast gaining a place in homes and offices across the country. In these vinyl applications, as in hundreds of others, the quality of the plasticizers contributes to the quality of the end product.

Enjay Isooctyl and Decyl Alcohols make excellent plasticizers. Like *all* Enjay petrochemicals, they are uniformly high in purity. Their controlled high quality sets the standard throughout the plastics industry.

The modern, well-equipped Enjay Laboratories have recently been expanded and are at your service for the application of any Enjay petrochemical.

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ALCOHOLS & SOLVENTS: Lower Alcohols, Oxo Alcohols, Ketones and Solvents; OIL & FUEL IMPROVERS: Detergent-Inhibitors, V-I Improvers, Oxidation-Inhibitors; CHEMICAL RAW MATERIALS: Olefins, Diolefins, Aromatics; ENJAY BUTYL RUBBER & VISTANEX.

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**ENJAY COMPANY, INC., 15 W. 51st STREET, NEW YORK 19, N. Y.** Akron, Boston, Chicago, Los Angeles, New Orleans, Tulsa

gypsy moth eradication program was the thing to watch. This could very well eliminate many centers of breeding, reduce the bug population on the East Coast, and some of the insecticide market along with it. Others point out that this program is found only in a limited area, and that the East Coast isn't as big in insecticide sales as its concentrated population might indicate.

## Brighter Dacron

**A liquid optical bleach** for Dacron has been developed by Geigy Chemical Corp. (Ardsley, N.Y.) The new product, Tinopal E Liquid, can be applied in various stages of fabric processing—a sodium chlorite bath, an antichlor treatment, or in the oxalic acid/ammonium bifluoride graphite removal operation.

Geigy claims the new brightener has good resistance to washing, atmospheric fading, pressing, perspiration, acid and alkaline spotting and is practically unaffected by heat setting or subsequent treatment with melamine resin. One feature of the bleach: it's brightening effect is noticeable under artificial as well as natural light.

## PRODUCTS

**Say When:** Emson Research, Inc. (Bridgeport, Conn.), has what it says is the only metered aerosol valve that can be pressure-filled. It can be preregulated in manufacture to deliver an exact dose in the range between 50 mg. and 3 g. The company has designed containers incorporating the valve for pharmaceutical and cosmetic applications such as oral dispensers, nasal sprays, and purse- and pocket-size atomizers.

•

**Davies-Young Soap Co.** (Dayton, O.) has come up with what it claims represents a major improvement in the widely used urinal deodorant block. Using a base of dichlorodimethylhydantoin, the company has developed new compositions that, in the presence of moisture, decompose slowly and evolve chlorine at a steady, controlled rate over a relatively long period of time. The new composition, according to the company, eliminates odors (by killing odor-causing bacteria), disinfects, bleaches simultaneously.

**Snap Shots:** A simplified color developer for amateur photographers has been brought out by Adox Camera Works, the West German (Frankfurt) photo manufacturer. The company claims the material will make development of Adox color films easy for all concerned. The chemical solutions in the kit retain their properties eight weeks.

•

**New Disinfectant:** In West Germany, a novel disinfectant formulation, incorporating polychlormethylphenol, has been brought out. It is being made by Gerbstoffchemie Franz Margold (St. Stephan, near Darmstadt). The new chemical can be used as a preservative as well as a bactericide and fungicide. It is said to prevent decomposition of carbohydrates, proteins and the formation of mould. Polychlormethylphenol is odorless and is soluble in water, alcohol and acetone.

•

**Variations on PVC:** Ferro Chemical Corp. (Cleveland) has a new stabilizer for polyvinyl chloride, designed for use in calendered, molded, extruded and plastisol formulations. Claimed for the new product, numbered 1212-A: superior heat and light stability and low sulfur-stain potential, at a low cost.

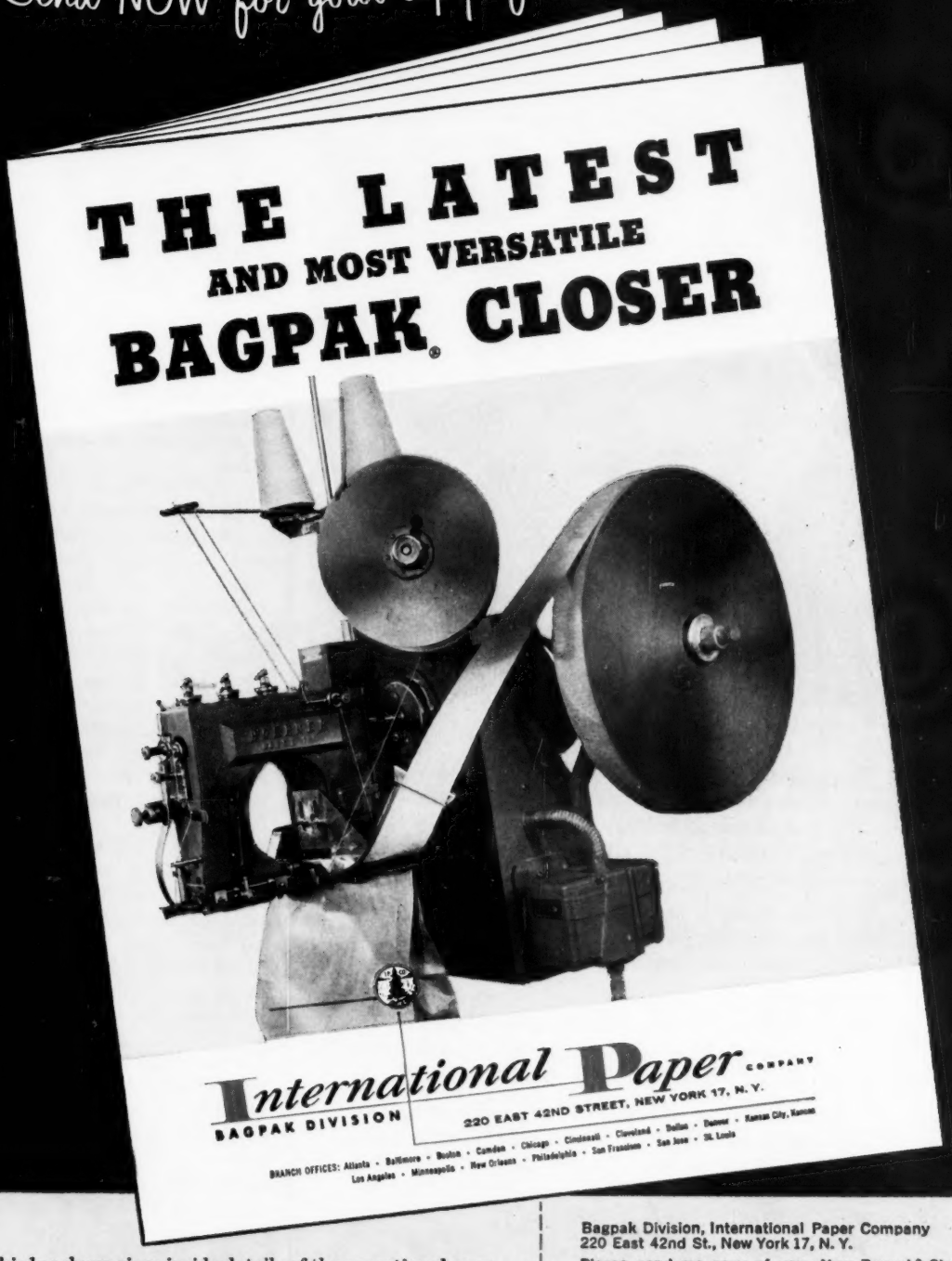
• An inhibitor, for use when a

WIDE WORLD

## Aerial Slider Paints a Wire

**There's more than one way** to paint a cable, as Ed Kivlin, of Upper Darby, Pa., demonstrated recently. Hired to paint a cable supporting a high-tension line, he tossed aside his brushes and worked up this arrangement: he fills a spongelike glove with paint, grabs hold of the cable and slides down, leaving a trail of paint. A line and pulley brings him back to the top again.

Send NOW for your copy of this NEW Book!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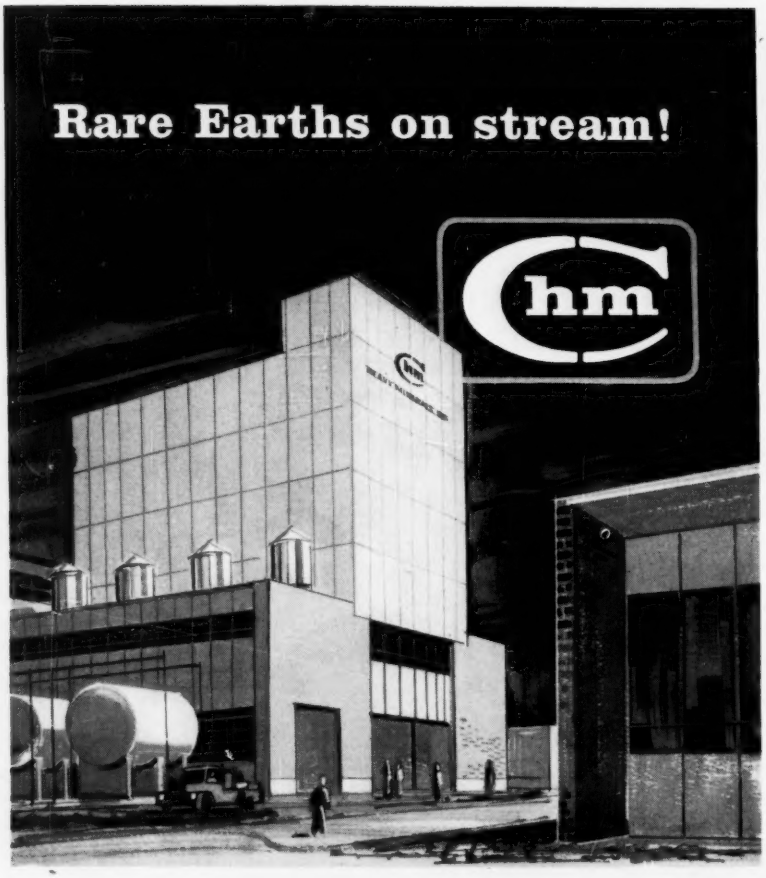


**Rare Earths** have remained rare only because of the exceptional technology required to process them. The best of this technology is everywhere evident in HEAVY MINERALS CO.'s new Chattanooga plant, now on stream.

Using domestic ores from its own mines, HEAVY MINERALS produces a complete line of rare earths for American industry.

The rare earths constitute a new industrial frontier. These 15 elements plus yttrium and thorium have so many versatile properties that almost all industries have a potential use for one or more of them.

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high degree of clarity is required, is another new product of Ferro Chemical Corp. Called Ferro 904, it is recommended for use with cadmium-barium metallic heat and light PVC stabilizers (such as the 1212-A, above) in rigid, calendered, molded, extruded and plastisol formulations.

• Pliovic S50, new from Goodyear Chemical Division (Akron, O.), is said to show processing properties characteristic of vinyl copolymers but retaining the physical properties of unmodified resins. According to Goodyear, the resin has extremely low viscosity (an inherent viscosity of 0.68), which gives the kind of plastic flow needed by producers of injection-molded and extruded products. Little or no plasticizer is required.

•

**Without Oysters:** A luster equal to or greater than natural pearl essence is claimed for a just-marketed synthetic material. It is called Nacromer YNC, is supplied by Mearl Corp. (New York) in concentrated paste form, which can be mixed with most coating materials and sprayed, brushed or dipped onto wood, metal, plastic glass, leather, paper and other materials. Different lustrous color effects may be obtained by adding transparent pigments or dyes.

•

**Soft Job:** A low-cost substantive softener for use with all fibers was developed recently by Dexter Chemical Corp. (New York). Dexter says it can be used either as a self-softener or in resin finishes. It is a cationic-nonionic agent called Dexene CS-15.

•

**Steam Bath:** An extra-concentrated liquid detergent for use in solution-lifting steam guns and self-generating steam cleaning equipment is now being introduced by Oakite Products Inc. Called Oakite LSD, the material is said to provide effective soil removal at concentration of 1-2 oz./gal. of water as delivered by the gun. Solutions have a pH of 12.

•

**Furry Factories:** For people desiring a rich fertilizer for household plants, Mink-Fer Co. (La Grange, Ill.) now offers mink manure in a tube, with a special root-feeding tip. Said to be exceptionally good manure

*when we say...*

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# Blueprint of Chicagoland Economic Opportunities

What industrial plant sites are available in Chicago and Chicago Heights? Where are they located in respect to transportation, shipping and other facilities? What materials are plentiful? What is the labor situation? What about housing—and schools?

This new book, "Chicago & Chicago Heights Industrial Economic Blueprint," has been published to answer these questions and many more. With maps, diagrams, charts, photographs and text, it gives you a detailed analysis of the area and its physical characteristics. Here are easy-to-grasp facts about population, labor force, raw materials, transportation, utility and business services. The significant figures covering some eighty-service classifications of manufacturing industries are tabulated for quick reference.

"The amount of detail work that went into the preparation of these reports is truly amazing. In all the years in which we have been engaged in plant location work we have never seen so much data collected on a particular area."—from a letter describing previous economic studies by Chicago & Eastern Illinois Railroad.

**Available without charge.** For a complimentary copy of "Chicago & Chicago Heights Industrial Economic Blueprint," write Mr. H. B. Sampson, Vice-President, Chicago & Eastern Illinois Railroad, 332 South Michigan Avenue, Chicago 4, Illinois.

C&EI

Chicago & Eastern Illinois Railroad



because of the careful feeding the valuable little animals receive, it is an organic product of high protein content.

•

**On the Stick:** A West German firm has come up wth a new waxlike base for lipsticks and other stick-form cosmetics. Called Comperlin HS, it is made by Dehydag (Dusseldorf), is distributed in the U.S. by Fallek Products Co., Inc. (New York). It is a stearic acid monoethanol amide, is said to be nonirritant, to have good emulsifying properties and a neutral taste. It is also said to facilitate the incorporation of dyes.

•

**Inert Coat:** Du Pont and Wilbur Co. (Boston) have jointly engineered a special chemical-resistant coating claimed to have two main advantages: (1) inert to almost any type of chemical attack; (2) comes in white and a number of bright colors. It's called Hypalon. Among other things, it is unaffected by ozone, an agent destructive to paint coatings frequently found around electrical equipment.

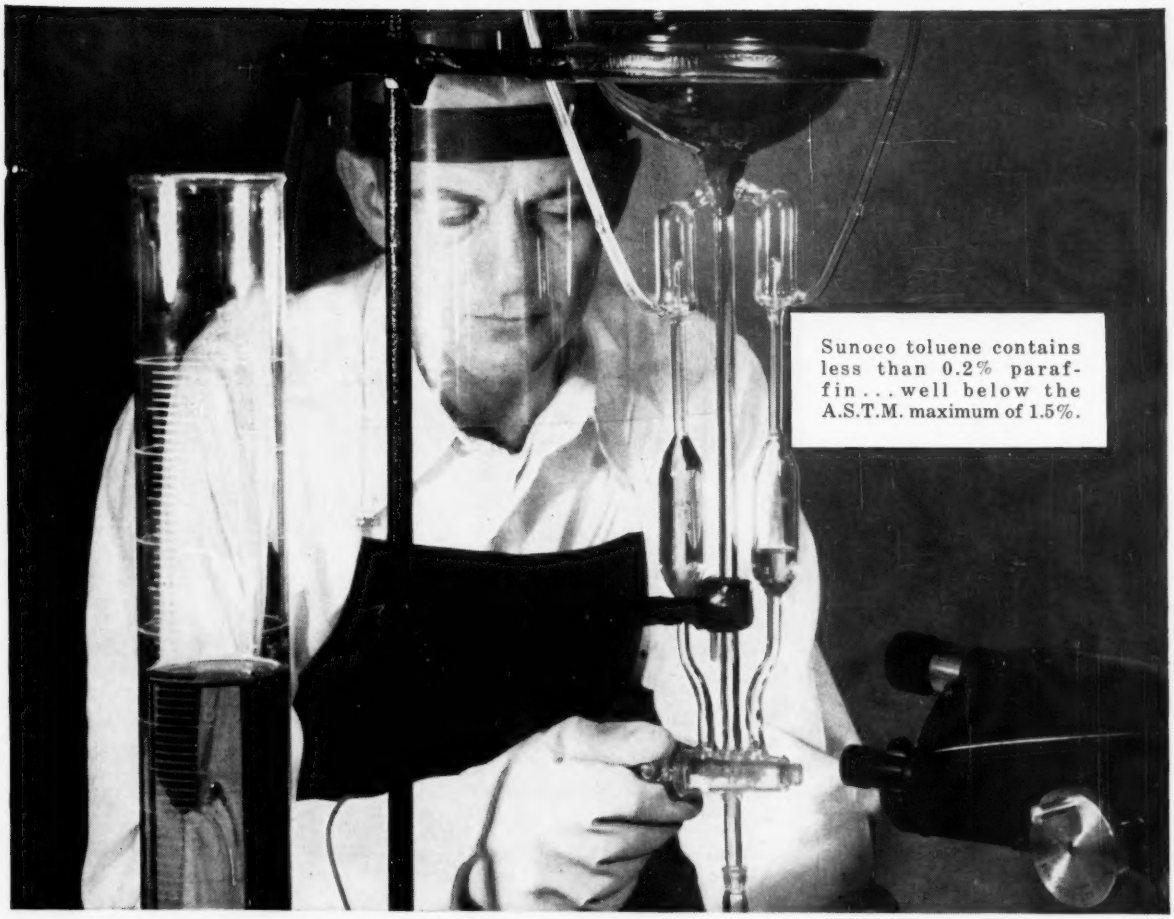
• Another chemical-resistant protective coating comes from Carboline Co. (St. Louis), a series of liquid zinc coatings that may be applied to steel by brush or spray. They are cured to form a tight nonporous 4-10-mil film in one coat, which affords galvanic protection to the steel. When the zinc is gone, a new coat may be applied in the field. Unlike earlier zinc coatings, the Carboline product is said to have a lower zinc content and increased binder strength that provides tougher, tighter and better bonding coatings.

•

**For Light that Fails:** Amber polyethylene bottles have been introduced by Clayton Chemical Co. (Chicago) for packaging light-sensitive products such as photographic solutions and powders. Sizes now available are 8 oz. (49¢), 16 oz. (80¢), 24 oz. (89¢), 32 oz. ($1.25) and 1 gal. ($2.20).

•

**Joiner:** A new product designed as a sealant for curtain wall construction has been introduced by Pecora Paint Co. (Philadelphia). The new sealant, called Synthacalk, comes in two containers; one has the base compound and another holds the activator. Flexibility, says the company, can be maintained between —65 to 225 F.

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**Sunoco toluene *consistently* surpasses** the highest quality standards. Olefinic impurities, determined by the Bromine Index Test, never range over 25 parts per million. (Many reagent and other nitration grades contain as much as 500 to 2,000 parts per million.) Sunoco toluene is sulfur-free and contains no gum-forming compounds.

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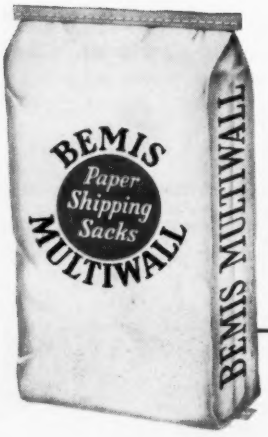
Don't *under*-package . . .

It's easy to

# package




*Whatever the nature of your shipping container problem, Bemis may already have exactly the package you need. If not, we'll help you work out a practical, money-saving solution.*

. . . it's costly—

You may be using drums, cartons, liners, overslipped bags or other excess-strength containers . . . which are not only expensive to buy, but pile up costs for shipping, storage space and handling.

it's costly, too—

You may, by cutting on package costs, be under-packaging . . . actually tossing money away through losses by sifting, breakage, deterioration or damage claims. Yes, under-packaging can be expensive, too.

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Bemis Multiwalls, made with special protective sheets, as required, may well be your solution. They are sturdy and tough, to resist breakage. They are sift-resistant. Specified liners, laminated, impregnated or coated sheets can be utilized, for example, to pack acids, contain odors, prevent evaporation, and to meet dozens of other rigid requirements.

**And Bemis Multiwalls are economical . . .** in first cost, in shipping cost (they're very lightweight), and in savings on valuable storage space. *They can be your answer to over-packaging or under-packaging.*

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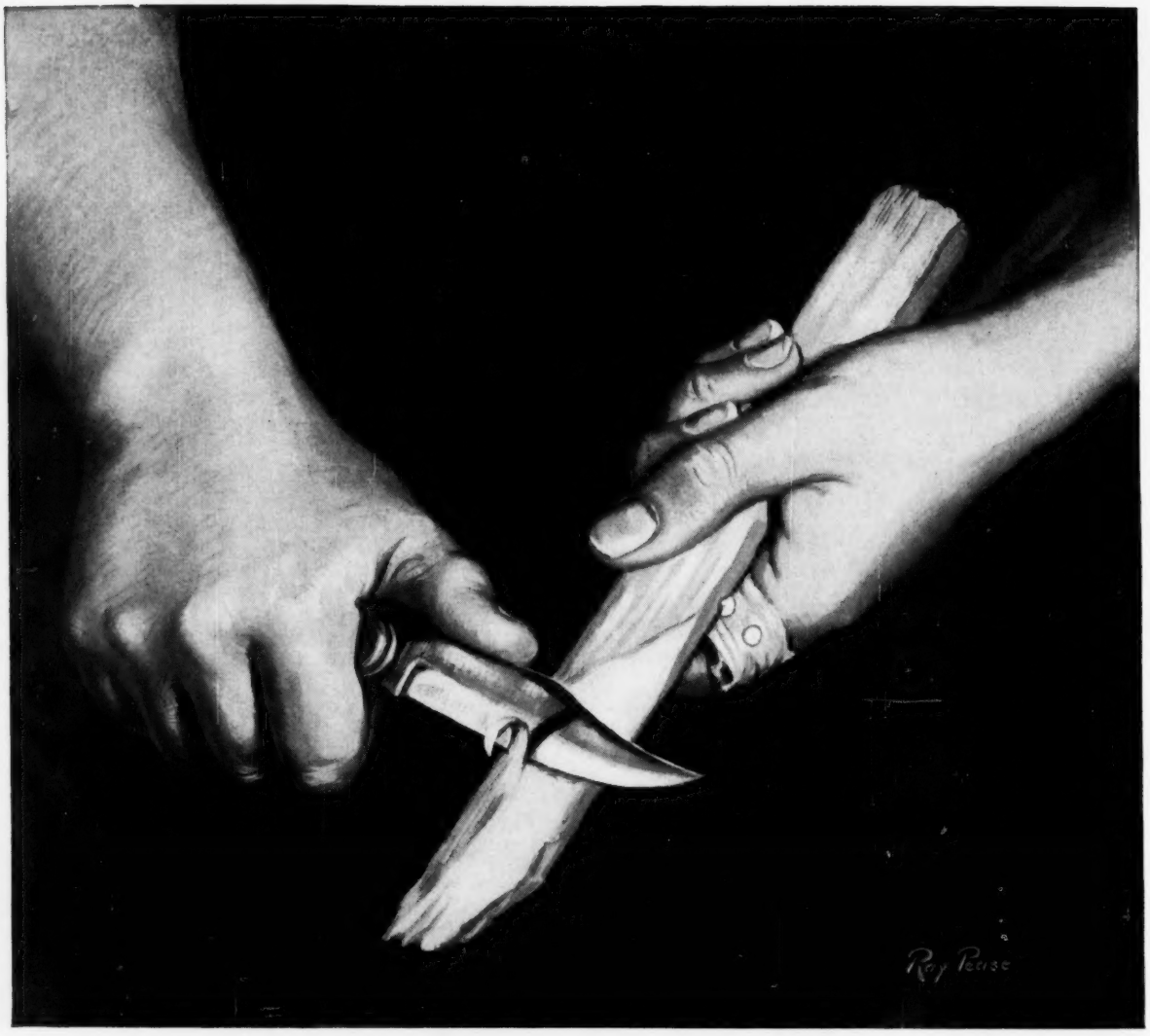


# One of a kind!

Kids still love jacknives, but no longer seem to do much whittling. Like the circus big-top this vanishing pastime seems to be one more casualty of this high-G, triple-carburetion age.

The production engineer also has lost his enthusiasm for whittling metal. Machining from solid bar is still a necessity when making one part or a few prototypes. But, for hundreds of parts, extruded shapes save metal and machining time.

TMCA has pioneered the difficult art of extruding Titanium alloys. Many thousands of pounds of extruded Titanium sections are regularly shipped to jet engine and airframe industries. Seamless extruded tubing is another regular production item at TMCA.

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# Washington
## Newsletter

CHEMICAL WEEK
June 15, 1957

**Britain's Red China trade-ban relaxation got a mild reception** in Washington. To some, it was a surprisingly mild reaction, since the U. S. is still officially committed to a flat embargo on all trade with Communist China.

Instead of the anguished cries of protest that used to be heard on Capitol Hill whenever anyone mentioned an increase in China trade, a number of congressmen now suggest a reappraisal of the U.S. stand.

Sen. Warren Magnuson (D., Wash.), chairman of the Senate Interstate & Foreign Commerce Committee, feels that "we can't keep 400 million people behind a bamboo curtain forever." He plans hearings to examine the over-all direction of U.S. trade policy. And President Eisenhower indicates he will go along with some relaxations.

**To the chemical industry, relaxation of China trade bars,** even to the extent Great Britain is removing its barriers, is still no "open sesame." For example, those items on the free-world's embargo list for all Communist countries—including such items as hydraulic fluids, explosives, fuels, and other materials with war-making potential—are still barred from shipment to China. What the British are doing is this: they are allowing foreign exporters to send to China the same items they may send to other Red nations—if, of course, they have orders for the goods.

The specific lists are reputedly classified top-secret, but a good rule of thumb by which to measure effects of the new policy is this: if the item is really strategic, it can't be sent to any Communist country. Fringe items can now be sent to China, as they have been to other satellite nations by most of the free world. The U.S., however, still maintains an outright China embargo. Even on this score, support is weakening.

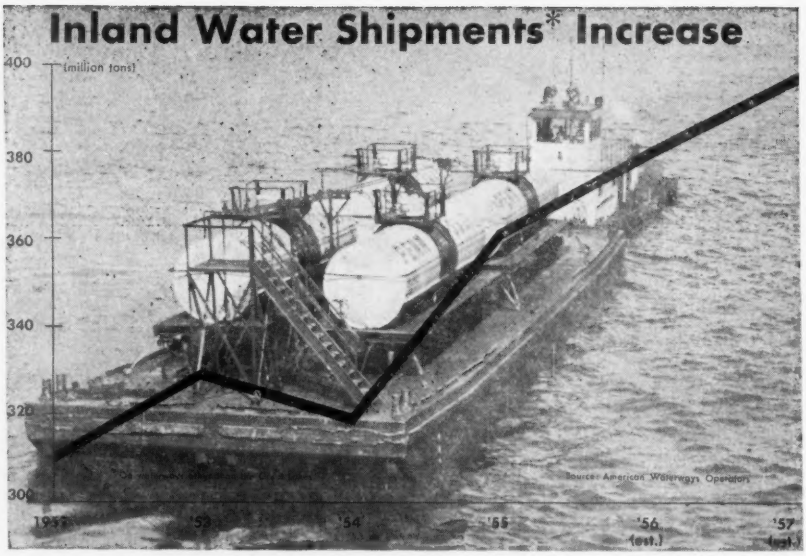
**Businessmen probably won't run the BDSA industry divisions** much longer. A change in the WOC programs—covering industry executives who serve in government jobs without compensation—is in the works at the Commerce Dept.'s Business & Defense Services Administration.

The plan now being considered would change the present policy for selecting heads of divisions such as the one covering chemicals and rubber. Currently, divisions are headed by industry men serving six-month terms. (Monsanto's Hal G. Johnson is in charge of the chemical division.) Under the new plan, career civil servants who have been serving as deputy division directors would take formal charge of the divisions. The division's WOC would then serve it as a consultant.

**The move is aimed at fending off Congressional criticism** of alleged conflicts of interest between a man's industry and government jobs.

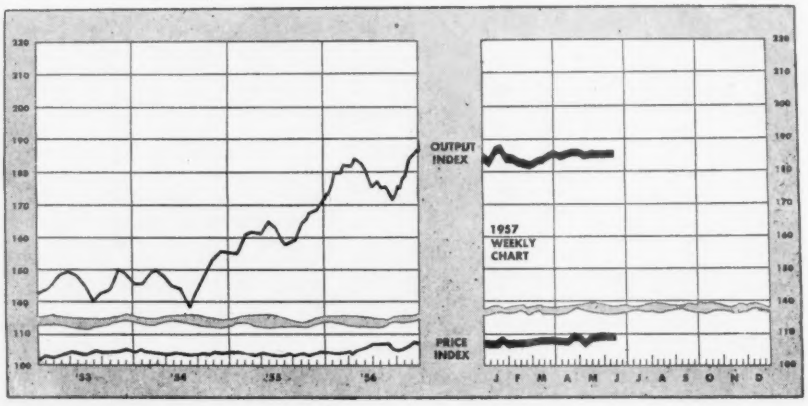
# Charting Business

CHEMICAL WEEK
**June 15, 1957**




## Chemicals Go the Water Route

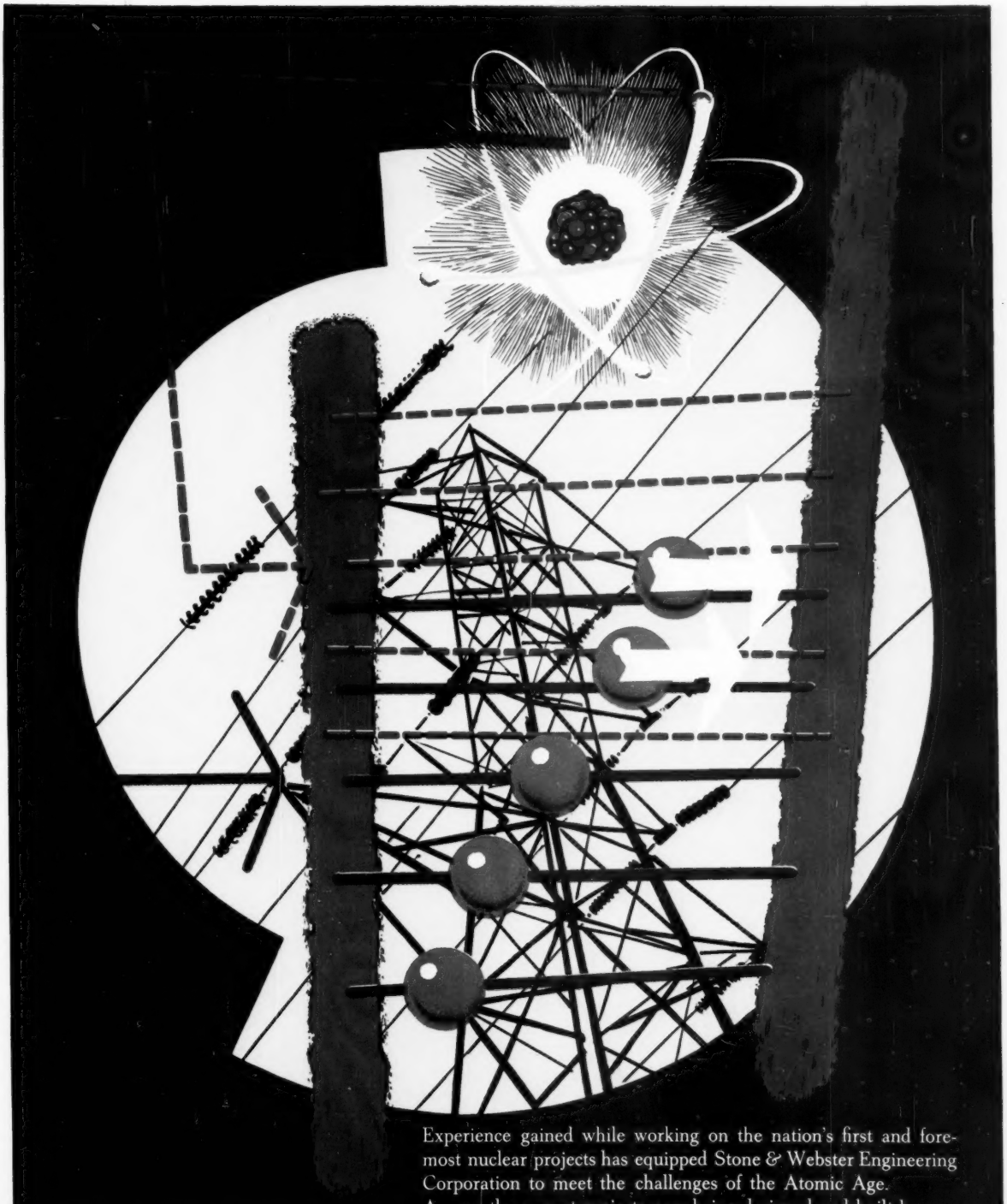
THE 29,000 miles of navigable inland waterways in the U.S. are handling more traffic than ever before. *CW* estimates that some 7 million tons of chemicals will travel by inland waterways this year, compared with 4.4 million tons in 1950. The breakdown for '57: about 3 million tons of industrial chemicals, 2 million tons of sulfuric acid, about 1.5 million tons of coal-tar products.




## Business Indicators

| WEEKLY | Latest Week | Preceding Week | Year Ago |
|---|---|---|---|
| **Chemical Week** output index (1947-49=100) | 184.8 | 186.3 | 178.3 |
| **Chemical Week** wholesale price index (1947=100) | 110.0 | 110.1 | 105.7 |
| Stock price index of 11 chemical companies (Standard & Poor's Corp.) | 44.82 | 45.32 | 47.13 |

| MONTHLY—Foreign Trade (million dollars) | Exports | | | Imports | | |
|---|---|---|---|---|---|---|
| | Latest Month | Preceding Month | Year Ago | Latest Month | Preceding Month | Year Ago |
| Chemicals, total | 139.0 | 99.1 | 112.6 | 25.1 | 23.2 | 27.1 |
| Coal-tar products | 8.9 | 5.4 | 5.9 | 4.7 | 5.1 | 4.8 |
| Industrial chemicals | 20.1 | 17.8 | 18.0 | 6.9 | 7.0 | 7.7 |



Experience gained while working on the nation's first and foremost nuclear projects has equipped Stone & Webster Engineering Corporation to meet the challenges of the Atomic Age.

Among the newest projects now being designed and built by Stone & Webster, in partnership with Westinghouse Electric Corporation, is the 134,000 kw Yankee Atomic Power Project at Rowe, Massachusetts — a plant which will bring to New England its first source of electric power from atomic energy.

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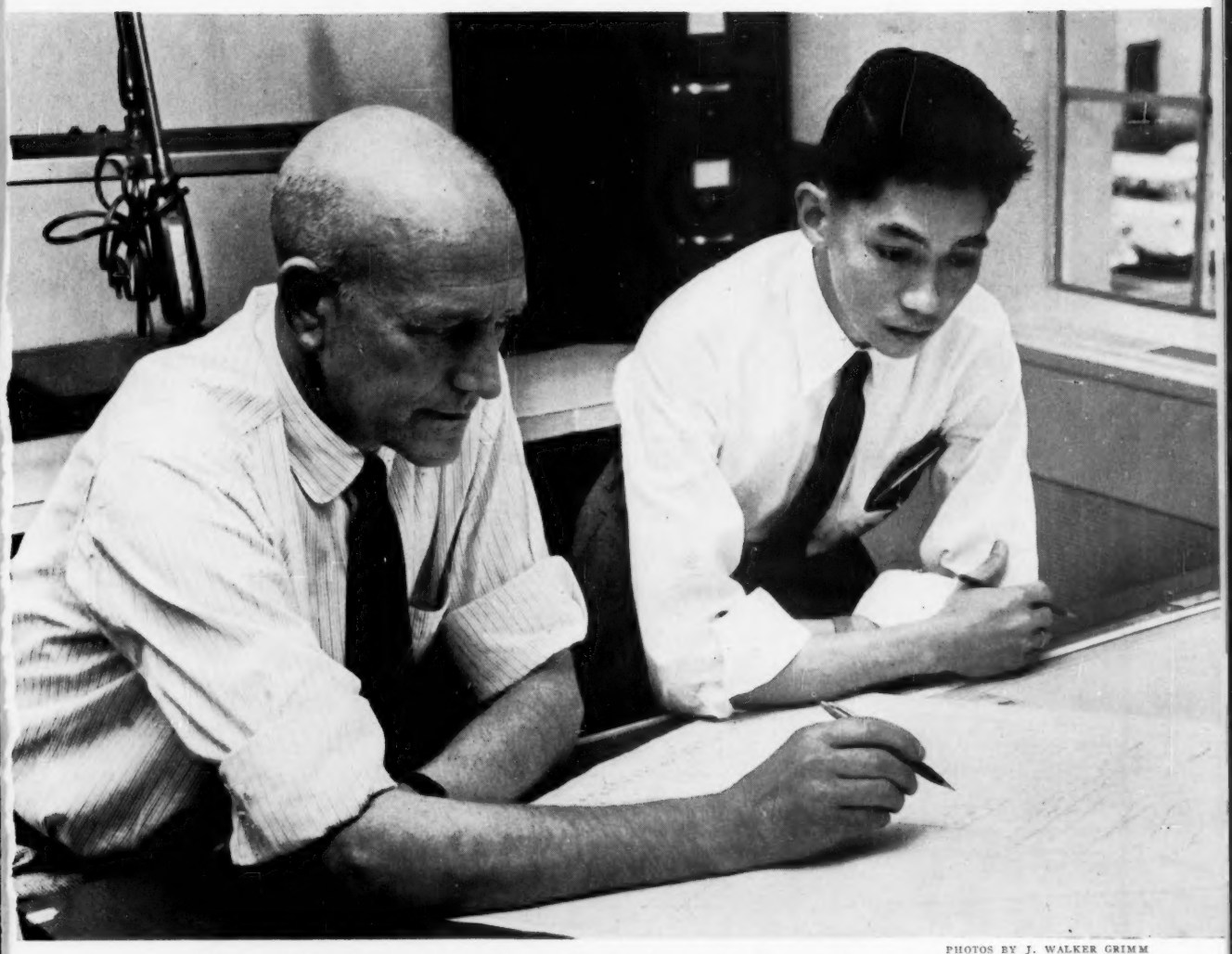

PHOTOS BY J. WALKER GRIMM

**TEACHER AND PUPIL: Reichhold's Walden helps train manager for Filipino plant.**

# How to Protect a Foreign Investment

WITH U.S. chemical firms earning $50 million a year through foreign licensing of chemical processes, companies that are most active in this field are finding that managerial skills have to be exported along with technical know-how.

One example: Reichhold Chemicals—affiliated with 23 plants in 19 foreign countries—helps protect its investments by providing U.S. training for "local" management. RCI is now bolstering its newest affiliate, Resins Inc. (Manila, Philippines) by training the firm's plant superintendent.

Meneleo Carlos, Jr., a Cornell graduate chemical engineer, is currently undergoing a six-month training and orientation tour of RCI facilities in this country. In addition to his just-completed stay at the company's White Plains, N.Y., headquarters, Carlos—now at RCI's Charlotte, N.C., plant—will tour a number of plants and participate in several plant-management training programs.

Carlos, who became the father of a girl—his first child—the day before he flew to the U.S., was thoroughly exposed to the resins business at the company's White Plains headquarters. In addition to sessions with vice-presidents Herbert Helbig, in charge of exports, and Theodore Hodgins, in charge of research, Carlos worked closely with Development Engineer Fred Walden making plans for the Philippines plant.

Along with Walden, "Mannie"—the nickname his

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*We cordially invite you to read this important message from Mississippi's Governor J. P. Coleman.*

## Chemical industries can prosper in Mississippi . . .

There's a good climate for industrial growth down in Mississippi. Under our State's famed BAWI program we can finance your new chemical plant in a community of your own choosing, and grant you tax exemption of five to ten years.

Every effort is made by the Governor, the Legislature and all responsible State officials to operate our State government on such a high plane of service, stability and economy as to leave no doubt in the minds of industrialists of the nation that Mississippi is a sound, safe and outstanding place in which to locate and operate—a place where they will receive fair and equitable treatment under sane and just laws.

Mississippi offers industrial enterprises the happy combination for a profitable plant operation — proximity to *markets*, a wealth of *materials*, and an adequate reservoir of *manpower*.

Would you like to know Mississippi's potential for your new plant? Please write me for the facts you need. We want you to know Mississippi.

J. P. Coleman
GOVERNOR OF MISSISSIPPI

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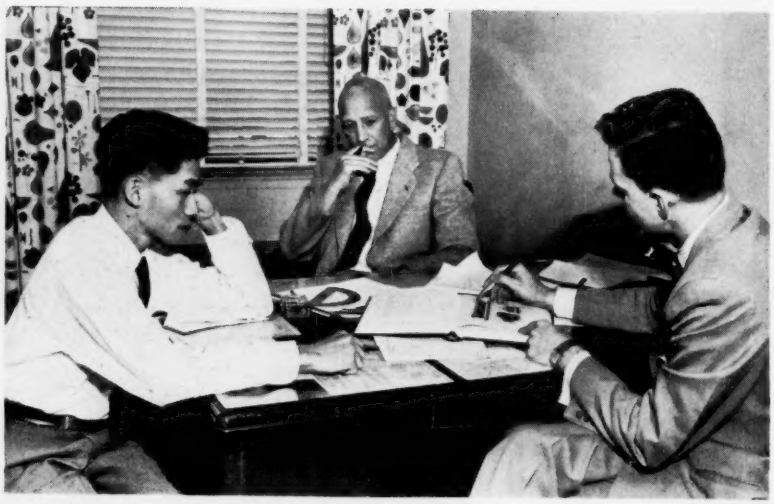


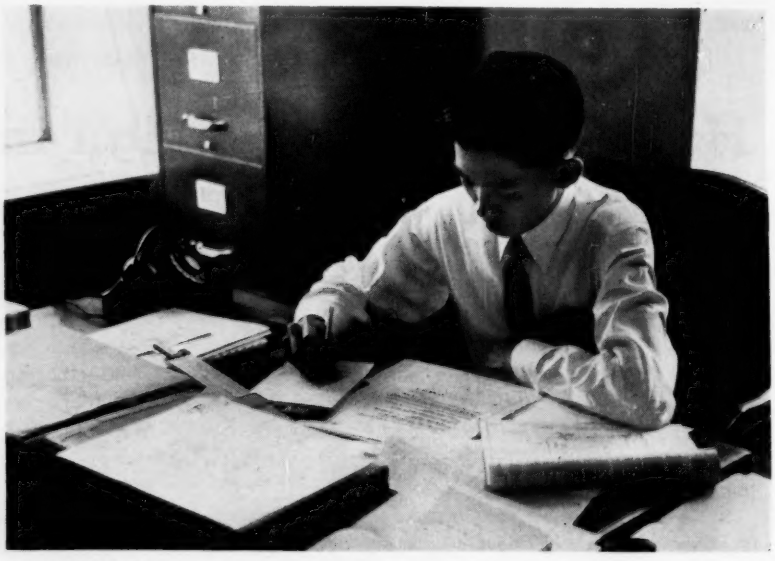
**BUYING equipment for Manila plant.**

RCI associates quickly substituted for Meneleo — interviewed some 200 equipment salesmen in the process of selecting equipment for the new plant. Carlos hopefully reports, "If nothing goes wrong, the necessary equipment will be on hand when the buildings are ready."

**Following Footsteps:** Graduated from Cornell in 1953, Carlos was the third successive generation of his family to receive a degree from the Ithaca, N.Y., college. Meneleo Carlos, Sr., is president of Resins Inc.

Carlos looks younger than his 28 years, but associates at RCI agree that the youthful features front for a keen, inquisitive mind that has helped the young executive win the admiration of many more-experienced Reichhold men.

**Due Onstream Soon:** The new resin plant—actually located about 10 miles from Manila—will be onstream late this year, or early '58. Principal products will be plywood adhesives, wood surface coatings, resins and textile chemicals. Initial capacity of the plant—designed, Carlos says, for easy expansion—will be 200 tons/month.



**STUDYING becomes second nature.**

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*(He's part of a quality control team that protects Dow caustic)*

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In the near future industrial chemicals will be considered, along with the possibility of producing the firm's raw materials that will be imported for the time being.

Reichhold's agreement with Resins Inc. calls for the U. S. firm to provide technical know-how, advice and process licensing. RCI has only a minority interest in the plant, as it has in all but three of its foreign affiliates. The plant will have a small research unit and a plywood testing laboratory. The latter will provide a much needed service to the Philippines plywood industry, according to Carlos.

Officials say RCI's position of minority stockholder in most of the firm's foreign ventures, makes it "simply a partner."

RCI contracts with foreign affiliates run for 10 years with renewal rights for another 10. In France and England, agreements have recently been renewed, and a renewal is coming up in Australia.

**Key to Success:** The Philippines plywood industry will most likely be the key to success for the new plant, Carlos says. "Our late President Ramon Magsaysay placed major emphasis on this industry," Carlos recalled, "and plywood is the chief building material and major export of the Philippines."

Since the adhesives for the plywood have to be imported—along with resins of all types—the industry has worked under somewhat of a handicap. This will change shortly, for not only will the RCI affiliate be producing, but Borden Co. (New York) has a resins plant under construction there, too.

The policy of exporting technical know-how is "old hat" with Reichhold, and the practice of bringing in local management from overseas plants is certainly not new with the chemical process industry.

But in addition to the security such training gives to foreign investments and licensing agreements, there is the further advantage that is gained from making a favorable impression in international relations. As RCI Board Chairman Charles O'Connor expressed it, "U. S. machinery, equipment and knowledge that enable foreign countries to produce their own finished products will do more toward creating friendships as a solid basis for peace than straight foreign aid."

## Plywood Import Plight

**The battle over plywood** imports is rapidly approaching a showdown, and the outcome will have a decisive effect on production of a number of items including formaldehyde, resins, adhesives and phenol. On the West Coast, for example, the plywood industry is one of the biggest chemical customers (*CW, June 1, p. 36*).

**Latest Maneuver:** A group of plywood importers and users has prepared a lengthy report to be submitted to Congress attacking the idea that domestic producers are being hurt by imports. The group hopes to block pending legislation that would slash plywood imports some 67%.

The report contains information gathered in a plant-by-plant survey aimed at checking the statement by domestic industry spokesmen that 28 plants have been forced by excessive imports to close. The group contends that the survey shows: 1) nine of the plants listed as being forced to close are still operating profitably; 2) five of the plants never existed; 3) three burned down; and 4) the rest had to close because of labor troubles.

Should Congress fail to pass quota-lowering legislation, domestic plywood producers are expected to request lower quotas under the defense essentiality clause of the Trade Agreements Act.

## LEGAL

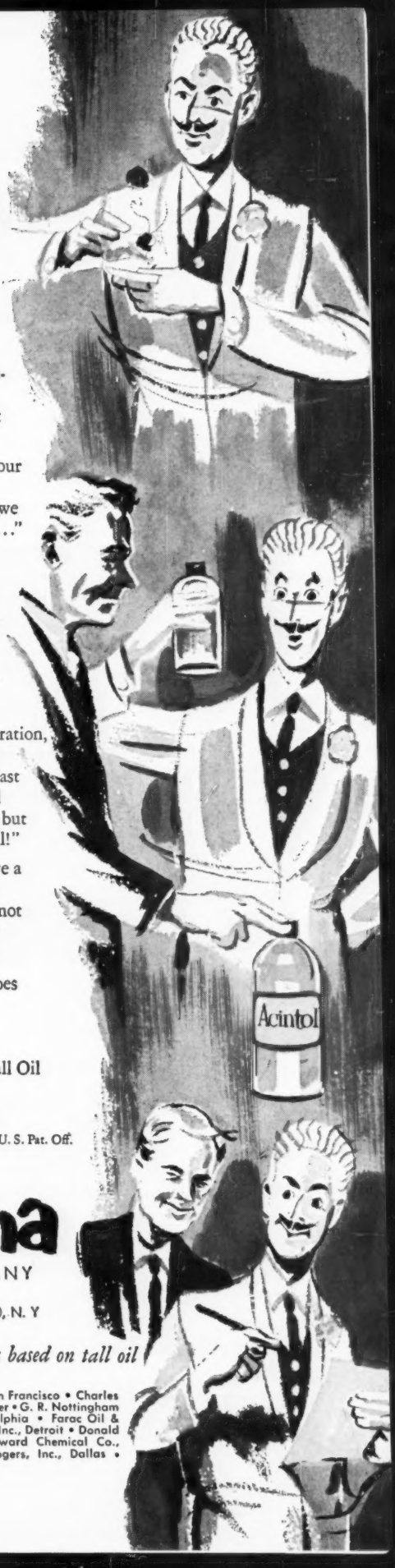
**Secret Briefs for Atomic Secrets:** U.S. Court of Appeals Judge Joseph McGarraghy (Washington) has decided that a suit to enjoin the Atomic Energy Commission from making public details of a system for making heavy-water and deuterium (*CW, May 11, p. 50*) will be tried on secret briefs.

The suit was brought by a New Rochelle chemical engineer, Jerome Spevack, in an effort to block disclosure of his invention until he has a chance to apply for foreign patents.

•

**Vit-Ra-Tox Suits:** In the federal circuit court at Boston, Judge Calvert Magruder has sustained Food and Drug Administration charges that literature and claims used in selling Vit-Ra-Tox "natural" vitamin-mineral supplements constituted misbranding under the Federal Food and Drug


# The man who rolled his own




Then there was this P.A. of *exceedingly* individual tastes. Couldn't abide ready-to-wear suits. Had his shirts hand-stitched. Even rolled his own cigarettes — couldn't find any packed to his liking.

You could see it coming when we made our first call. "We use only raw materials *exactly* suited to our processes. Not that we don't *like* to save money, you know, but..."

"Of course," we said, fetching up an ambrosial sample, "and we think our ACINTOL* FA — Tall Oil Fatty Acid is tailor-made for your alkyds." He picked up the bottle gingerly. *"Tailor-made?* But, remember, we need excellent color stability." We said, "Couldn't fit better."

He frowned. "But odor is a vital consideration, and naturally we couldn't..." We lifted the lid, he sniffed carefully, then took a last deep breath. "But isn't it —" he blanched —"cheap?" We thought he had us there, but we said, "Well, let's say it's — economical!"

"Young man," he said, "you seem to have a perfect understanding of our particular needs," and signed on the dotted line — not only for ACINTOL* Fatty Acid, but for our ACINTOL* D — Distilled Tall Oil.

If you are particular, too, about what goes into your alkyds, esters, emulsions, fatty acid amines, non-ionics, primer surfaces for automobiles, sulfonated oils or the like, look into ACINTOL* Tall Oil Products. It's so easy to get samples, typical analyses, technical assistance — just ask us!

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**FORESIGHT BY**

# Firestone

With world-wide rubber consumption at an all-time high, Firestone, the world's largest rubber producer, planned ahead to expand production of FR-S, Firestone's new high-quality synthetic rubber. A major step in the giant expansion program is the modern Butadiene plant at Orange, Texas, to supply basic raw material. For engineering and construction, Firestone called on CATALYTIC.

JUNE 26, 1956 AUGUST 28, 1956 OCTOBER 30, 1956

**CATALYTIC**
**CONSTRUCTION COMPANY**
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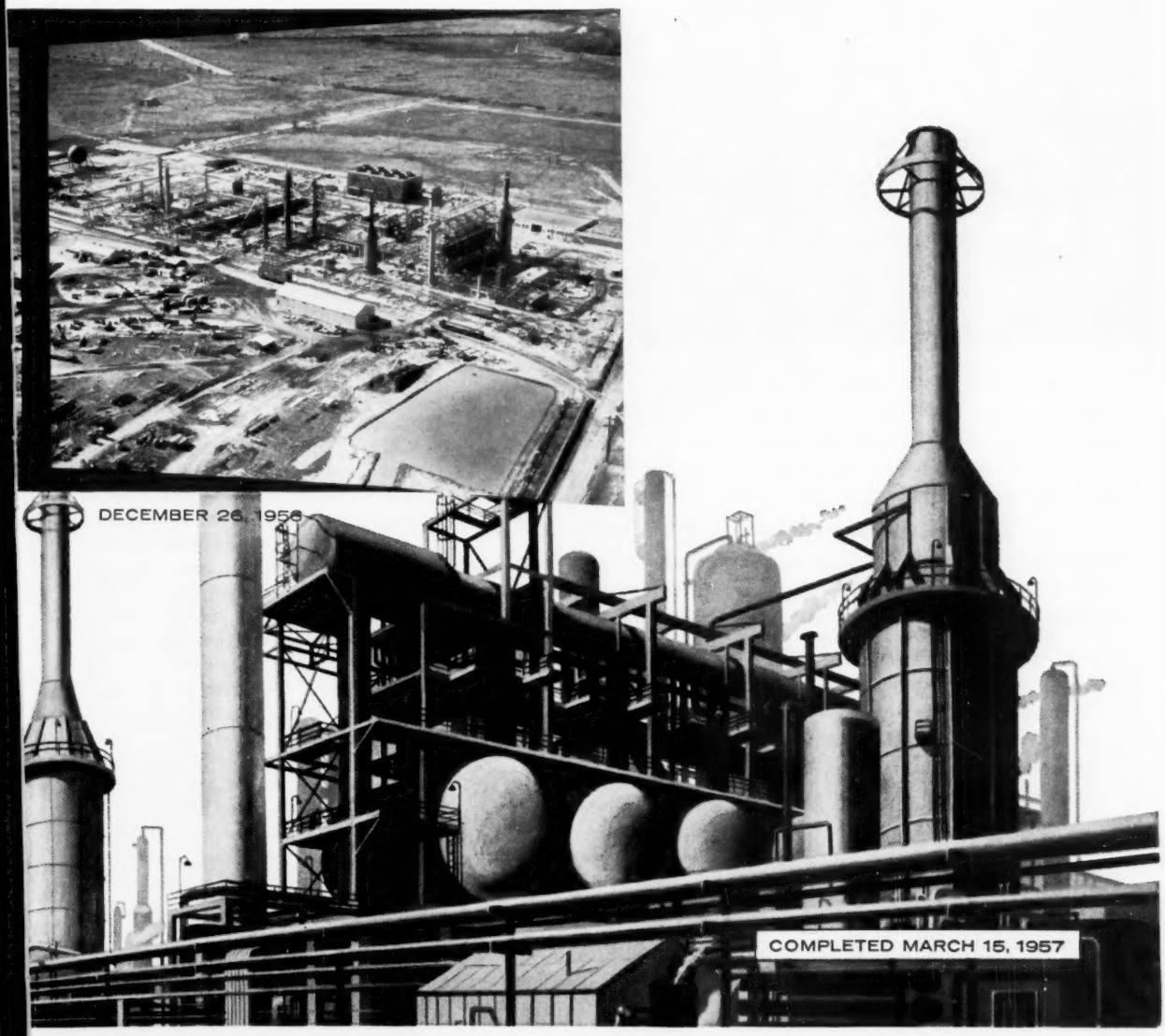
# PERFORMANCE BY CATALYTIC

Construction started—June 26, 1956
Plant completed—March 15, 1957 (less than 9 months in the field)

This outstanding performance clearly demonstrates the worth of undivided responsibility which enabled CATALYTIC to complete process design, engineering, procurement and construction of this multimillion dollar facility . . . on time and on budget.



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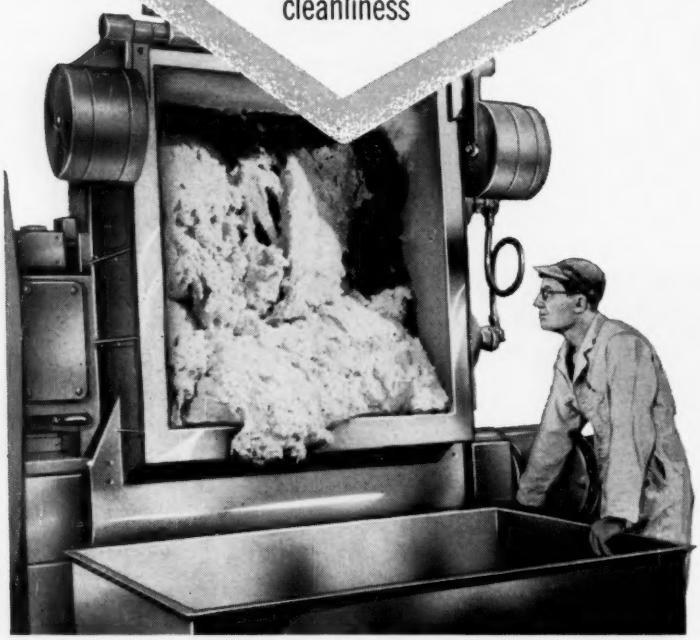

At the Dow Corning silicone plant in Midland, Michigan, some of the first pages in the history of silicone rubber were written. Today in Dow Corning's large, modern Silastic* building, Baker Perkins chemical mixers such as the one shown here, are steadily at work, busily filling the demand for this new product of chemical research.

Dow Corning engineers, with years of experience in silicones, invariably choose rugged, dependable B-P mixers because these machines get out a record volume of silicone rubber production with a minimum of lost time in cleaning and servicing. Dust-tight, these B-P mixers assure perfect product cleanliness.

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Call on your Baker Perkins Sales Engineer today. His long experience is yours for the asking.

*T.M. Dow Corning Silicone Rubber

**BAKER PERKINS INC.** SAGINAW, MICHIGAN

346

WIDE WORLD

**LARRICK: In April, seizure of 11 lots of drugs and a court victory.**

law. The court upheld the Oct. '56 Boston jury conviction of Vit-Ra-Tox manufacturers and the sentence of a year in prison and a $6,000 fine.

Other FDA actions in April, according to Commissioner George Larrick: seizure of 11 lots of drugs, including five new drugs, five allegedly substandard products, and one case involving misbranding.

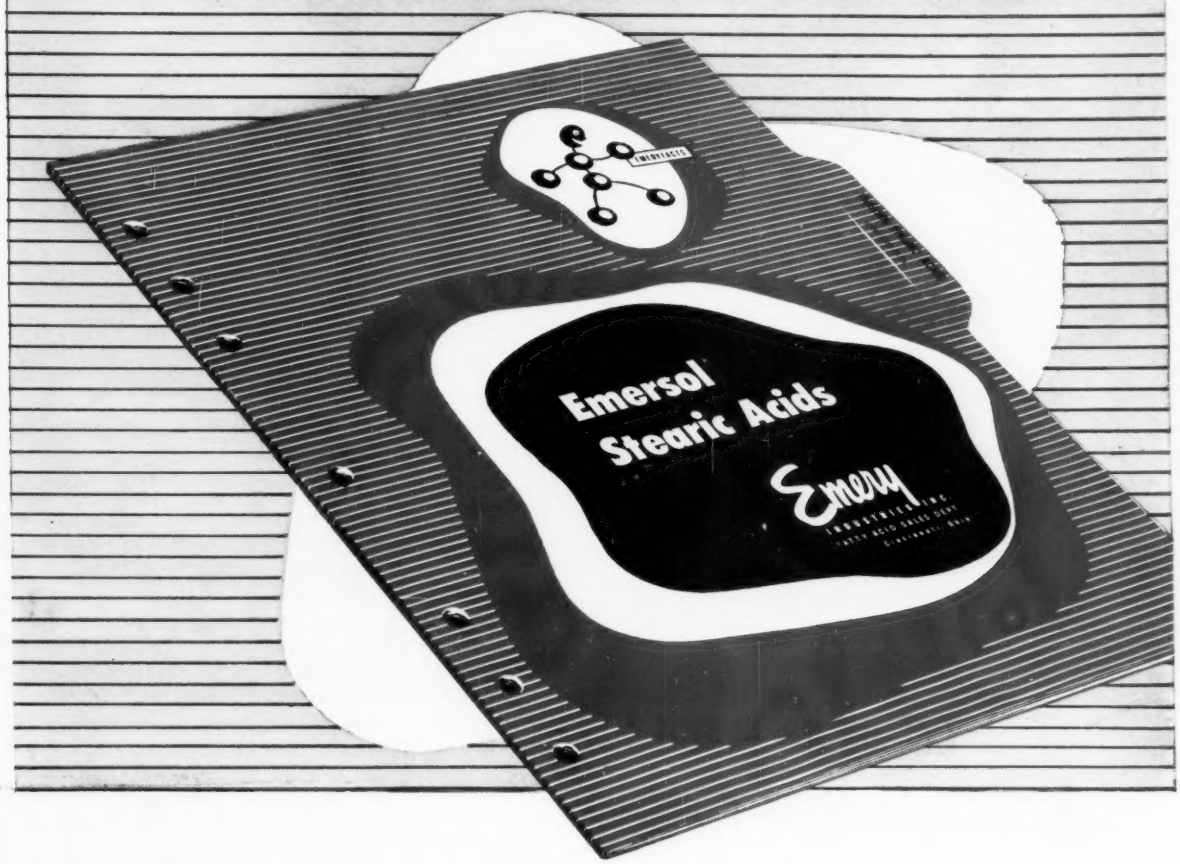
## LABOR

**Industry-wide Injunction:** While Oil, Chemical & Atomic Workers Union (AFL-CIO) was expressing satisfaction with what it calls an industry-wide pattern in 6% wage hikes for its members at oil refineries, it was being served with an industry-wide no-strike injunction in another chemical process field. At Cincinnati, U.S. District Judge John Druffel issued a permanent injunction that not only firmed up an earlier temporary order ending a five-day OCAW strike at the Goodyear Atomic Corp. plant at Waverly, Ohio, but also barred OCAW from striking at any atomic industry facility in the U.S. An OCAW spokesman said this order—agreed to by both the union and Goodyear management—would cover more than 6,000 employees at various plants where OCAW has representation.

•

**'Unleveling Increase':** In a new contract offer to its 5,700 unionized engineers, a large manufacturing com-

# NOW...to help you select and use Stearic Acids




The most comprehensive booklet on stearic acid yet published is now available for your use. This 24-page booklet, titled "Emersol Stearic Acids", is designed to help you in evaluating stearic acids and in selecting the best grade for your specific use by interpreting various test results in terms of end-product performance. Included also are brief discussions of Emersol Stearic Acids, tables of physical properties, and such charts as specific gravity, viscosity, etc.

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Cincinnati 2, Ohio

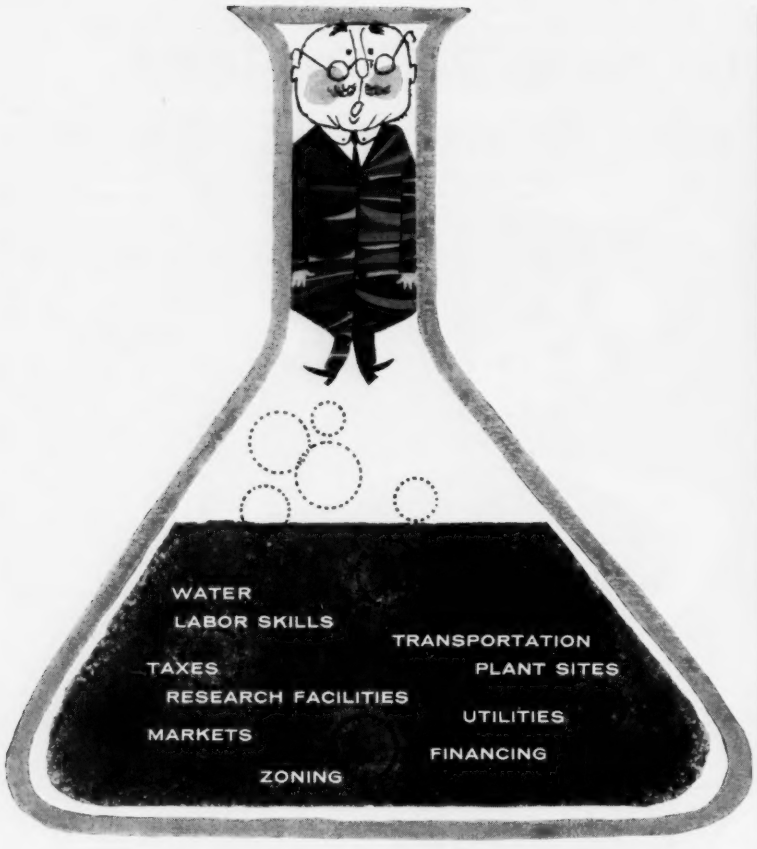
Please send me the Emeryfacts section titled "Emersol Stearic Acids."

Name.....Title.....

Company.....

Address.....

City.....Zone.....State.....

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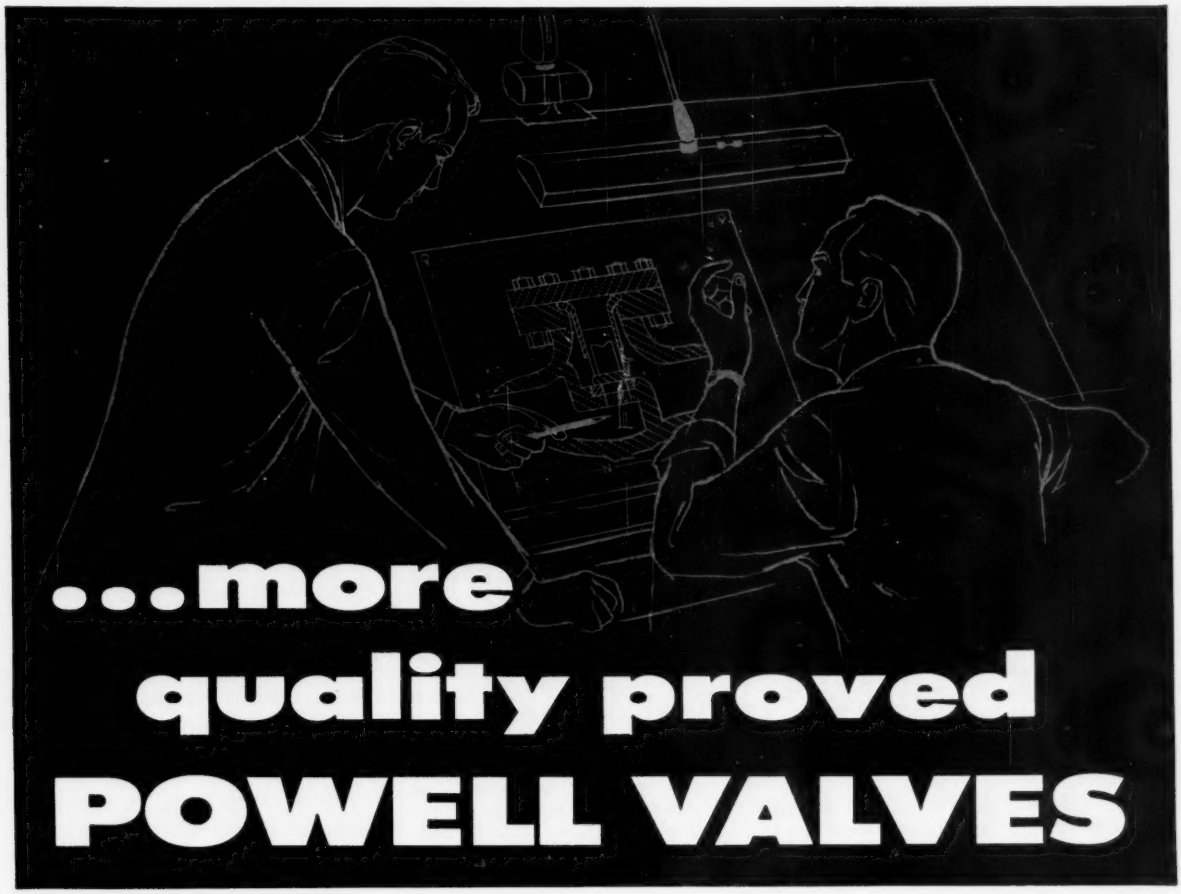
WIDE WORLD

**JUDGE DRUFFEL: No strikes in atomic units.**

pany has made a major concession to the engineering unions' complaint that the spread between salaries of beginning engineers and those of senior engineers has become too narrow. Boeing Airplane Co. (Seattle, Wash.) proposes to grant a two-part salary increase to engineers and other professional employees represented by a local affiliate of Engineers & Scientists of America. One part would be a 4% blanket increase, representing the difference in the offers being made to this year's engineering graduates as compared to starting salaries offered last year. The other part—ranging up to 2% for engineers in the highest pay brackets—is labeled a "salary unleveling increase" for engineers being paid more than $570/month and is intended to reflect the increments made in starting salaries in previous years. Thus Boeing engineers are being offered substantially greater increases than the company's other salaried employees and production workers, both of which groups have just received pay boosts of 3½%.

## IDEAS

**New Staff Unit:** American Viscose Corp. is merging two staff departments into a Technical and Textile Service Dept. that will provide—in one organizational unit—technical assistance of a staff nature to both the manufacturing and sales activities of the opera-



# ...more quality proved POWELL VALVES

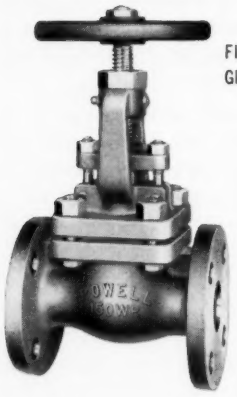
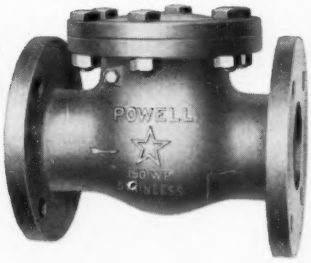


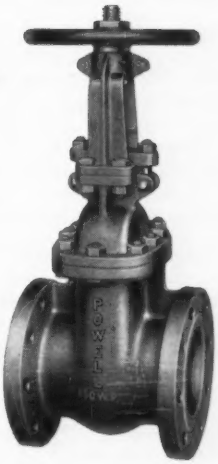
FIG. 2475—Stainless Steel O.S. & Y. Globe Valve for 150 Pounds W.P.

FIG. 2309 SW—150-Pound Flush Bottom Tank Valve with Powell Patented Seat Wiper.

FIG. 2456 SG—Large Stainless Steel Gate Valve for 150 Pounds W. P. Flanges conform to latest Standards.

FIG. 2433 SS—Large Stainless Steel Swing Check Valve for 150 Pounds W.P.



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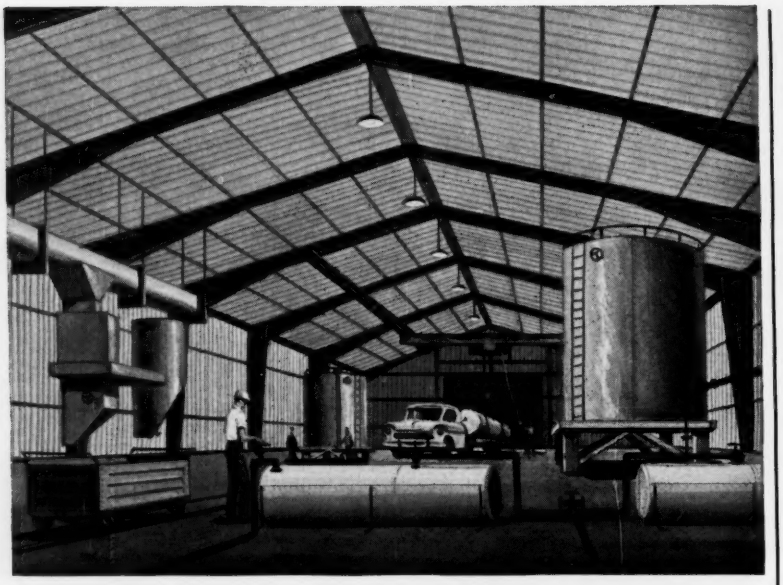

## Chemical men get rugged clear-span design, attractive *Stran-Satin* walls with NEW STRAN-STEEL BUILDINGS

The open, clear-span design of Stran-Steel buildings makes them ideal for the large tanks, vats, and associated piping required for chemical processing operations. In addition, new Stran-Steel buildings have a look of quality never before achieved in an all-steel structure.

Start with the smart *Stran-Satin* finish. *Stran-Satin* metal wall, exclusive with Stran-Steel, provides a strong, durable exterior with the weather resistance of zinc-coated steel. Special protective coatings are available for extreme corrosive conditions. Peaks, gables and eaves are completely enclosed with smart fascia flashing.

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## ADMINISTRATION

ting divisions. Specifically, the new department will:

- Continue Avisco's textile research assistance to the customers.
- Collaborate with textile machinery manufacturers in the interest of improved technology.
- Work closely with Avisco's Research & Development Division in providing technical service in support of plant operations, sales and customer relations.

•

**Medical Comic Book:** As a three-way good-will project in public service, public relations and customer relations, E. R. Squibb Division of Olin Mathieson Chemical Corp. is distributing—through retail druggists—copies of a 36-page comic book, "The Medics of America," written especially for children. It contains stories, games, cutouts, coloring pages and puzzles designed to sharpen children's understanding of the medical and allied professions.

## KEY CHANGES

**W. F. Otterstrom,** to controller, Olin Mathieson Chemical Corp.

**John D. Biggers,** to chairman and chief executive officer, Libbey-Owens-Ford Glass Co. (Toledo, O.).

**Kenneth H. Klipstein,** to vice-presiden for personnel relations; and **R. P. Parker,** to manager, Research Division; American Cyanamid Co.

**B. R. Richey,** to vice-president; **W. J. Turbeville, Jr.,** to vice-president, fertilizer sales; and **D. S. Parham,** to vice-president, production; American Agricultural Chemical Co. (New York).

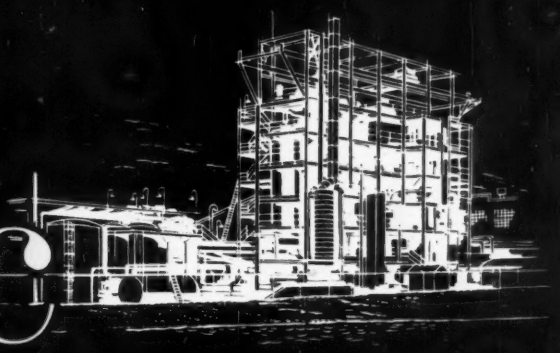
**Richard O. Westley,** to vice-president in charge of Chemurgy Division, Glidden Co. (Cleveland, O.).

**Thomas M. Ware,** to director; and **Milton Le Baron,** to vice-president in charge of research; International Minerals and Chemical Corp. (Chicago).

**Joseph E. Rich,** to vice-president in charge of the chemical division, Morton Salt Co.

## ASSOCIATIONS

**C. Russell Mahaney,** vice-president and director, St. Regis Paper Co., to president; and **R. B. Gutsch,** president, aaRBee Plastic Co. (Los Angeles), to vice-president and director; Society of the Plastics Industry (New York).



# organic chemicals

FROM ROHM & HAAS COMPANY

## Acrylic monomers

ACRYLIC ESTERS—A wide range of monomeric acrylate and methacrylate esters is available, providing a series of monomers whose polymers vary from very soft, rubber-like, film-forming materials to hard, transparent plastics. These esters may be polymerized by a variety of processes—bulk, suspension, solvent, and emulsion. They copolymerize readily with a large number of other monomers, permitting considerable modification in the physical properties of the resulting copolymers. *Typical uses:* Polymers and copolymers of monomeric acrylic esters are useful as thermoplastic sheets and molding powders, solvent coatings, binders for explosives, heat-resistant elastomers, adhesives, water-soluble thickeners, and emulsions for the textile, leather, paper, and paint fields. They are also used as intermediates for pharmaceuticals, photographic chemicals, and detergents.

ACRYLIC ACIDS – Both glacial acrylic and glacial methacrylic acid are available. These water-soluble acids may be polymerized to water-soluble polymers, or they may be copolymerized with other monomers to obtain polymers having varying degrees of solubility in alkali or water. *Typical uses:* The use of small quantities of these acrylic acids in copolymers can: 1) provide a product which can be vulcanized with metallic oxides without use of sulfur, or can be cross-linked with diepoxides, diamines, glycols, etc., 2) increase the mechanical stability of emulsions, 3) improve adhesion, 4) increase resistance to attack by oils. Amphoteric copolymers may be produced by copolymerization with basic monomers such as dimethylaminoethyl methacrylate. The acids also serve as intermediates for the production of special esters such as glycol diacrylate and dimethacrylates.

OTHER MONOMERS—*Methacrylamide* is a water-soluble monomer, which can be polymerized to a water-soluble polyamide, or copolymerized to give a reactive group for cross-linking purposes. *Dimethylaminoethyl methacrylate* is another water-soluble monomer, which can be polymerized to a water-soluble cationic polymer, copolymerized with "neutral" monomers such as acrylonitrile to introduce a basic group, or with an acidic monomer such as methacrylic acid to give a polyampholyte.

### *The following acrylic monomers are available:*

*Commercial Quantities* : Methyl acrylate • Ethyl acrylate • Butyl acrylate • 2-Ethylhexyl acrylate • Methyl methacrylate • Ethyl methacrylate • Butyl methacrylate • Hexyl methacrylate • Decyl-octyl methacrylate • Lauryl methacrylate • Stearyl methacrylate • Glacial methacrylic acid

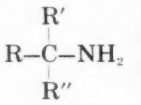
*Pilot Plant Quantities* : Methoxyethyl acrylate • Glacial acrylic acid • Methacrylamide • Dimethylaminoethyl methacrylate

# Methylamines

Rohm & Haas methylamines, monomethylamine: $CH_3NH_2$, dimethylamine: $(CH_3)_2NH$, and trimethylamine: $(CH_3)_3N$ are very low-cost sources of basic organic nitrogen. All three amines are available in either aqueous or anhydrous form. *Typical uses:* The dimethyldithiocarbamates and tetramethylthiuram sulfides have shown usefulness as agricultural fungicides, accelerators for rubber vulcanization, and animal and insect repellents. Surface active agents are available by several synthetic routes starting with monomethylamine. Monomethylamine also is used in the preparation of p-methylaminophenol, the sodium salt of which is utilized in photographic developers. 1,3-Dimethylurea, produced from monomethylamine, is an intermediate in the synthesis of theophylline and caffeine. Monomethylamine is a raw material for a number of sympathomimetic drugs (e.g., N-methyl-phenethylamine or N-methyl-phenylpropylamine derivatives) and analgesics not related to or derived from morphine. Dimethylaminoethanol, an intermediate for local anesthetics and antihistamines, is prepared from dimethylamine. The preparation of choline chloride, widely used poultry feed additive, employs trimethylamine. Other uses for the methylamines include the production of high molecular weight quaternary ammonium salts, acidic-gas absorbents, and explosives. Commercially available.

# **Primene** alkyl amines

The Primene® alkyl amines, Primene JM-T and Primene 81-R, primary amines, are free-flowing liquids having the general formula:

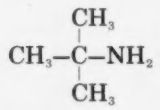


where R, R′ and R″ are alkyl groups.

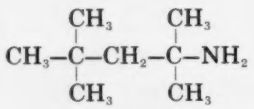
Primene JM-T contains 18 to 24 carbon atoms; Primene 81-R, 12 to 15 carbon atoms. These products undergo most of the reactions typical of straight-chain primary amines. In some cases, however, their reactivity is unusual. They react, for example, with formaldehyde to yield relatively stable, monomeric azomethines ($RN=CH_2$). *Typical uses:* The excellent oil solubility, color stability, resistance to oxidation and fluidity of the Primene amines are advantageous in oil additives. Other suggested applications for derivatives include bactericides, fungicides, corrosion inhibitors, anti-oxidants, textile chemicals, and pharmaceutical products. Commercially available.

# t-Alkyl amines

These amines, t-butylamine and t-octylamine, are light-colored liquids having the structural formulae:



t-Butylamine



t-Octylamine

Tertiary-butylamine boils at 44° to 50° C., tertiary-octylamine at 137° to 143° C. These amines undergo most of the reactions common to the primary amines, with some few exceptions. When reacted with aldehydes, for example, t-butylamine and t-octylamine yield relatively stable, monomeric aldimines ($R\text{-}N=CHR'$); with cyanogen chloride, stable monomeric cyanamides (R-NH-CN). The t-alkyl primary amines can be alkylated and alkoxylated to produce secondary amines, with the formation of very little tertiary amine. *Typical uses:* intermediates for rubber chemicals, insecticides, bactericides, oil additives, photographic chemicals, pharmaceuticals, surface active agents, corrosion inhibitors, and dyestuffs. Commercially available.

# **Priminox** polyethoxy amines

These amines have the general formula:

$$R\text{-}NH(CH_2CH_2O)_nH$$

where n is the number of ethoxy groups and R represents a tertiary-alkyl group of 18 to 24 total carbon atoms. They are obtained by reaction of Primene JM-T with ethylene oxide. Priminox® 43, a liquid at room temperature, has one ethoxy group. It is soluble in aromatic hydrocarbons and common organic solvents. Priminox 10, also a liquid at room temperature, has 5 ethoxy groups. It is slightly soluble in oil and water. Priminox 21 has 15 ethoxy groups, is a paste at normal temperatures, and is soluble in water and aqueous acids. Priminox 32 has 25 ethoxy groups, is a solid at normal temperatures, and is soluble in water and aqueous acids. The Priminox amines effectively reduce surface and interfacial tension over a wide pH range, and are useful in low-foaming, efficient detergents. They are also suggested for use as bactericides, corrosion inhibitors, and fuel oil additives. Commercially available.

# **Dytol** fatty alcohols

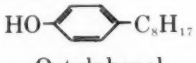
The Dytol® fatty alcohols are long-chain compounds having the general formula $CH_3(CH_2)_nOH$. Typical alcohol compositions of the various Dytol alcohols are given in the accompanying table.

The Dytol alcohols undergo many of the chemical reactions typical of alcohols. They may be ethoxylated, sulfated, esterified, halogenated, and dehydrated. They may be oxidized to aldehydes and carboxylic acids. *Typical uses:* As intermediates, the Dytol alcohols are useful in additives for cosmetics, polymerization regulators for rubber, textile finishing and softening agents, pharmaceutical quaternary ammonium compounds, and emulsifiers and detergents. Commercially available.

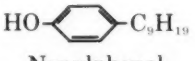
| | Dytol B-35 | Dytol A-24 | Dytol J-68 | Dytol L-79 | Dytol E-46 |
|---|---|---|---|---|---|
| % Decyl ($C_{10}$) | 1.5 | 1.5 | 1.0 | 5.0 | none |
| % Lauryl ($C_{12}$) | 60.0 | 71.0 | 80.0 | 95.0 | none |
| % Myristyl ($C_{14}$) | 25.0 | 27.0 | 19.0 | none | 1.2 |
| % Cetyl ($C_{16}$) | 13.0 | 0.5 | none | none | 34.0 |
| % Stearyl ($C_{18}$) | 0.5 | none | none | none | 64.8 |

# Alkylphenols

Octylphenol, a light-colored, flaked solid and nonylphenol, a pale amber liquid, have these formulae:




Octylphenol

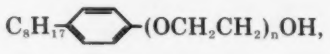



Nonylphenol

Both alkylphenols are insoluble in water, but soluble in many common organic solvents. They undergo most of the reactions common to phenols; namely, nuclear substitution, esterification, etherification, and salt formation. *Typical uses:* Reaction with alkylene oxides yields non-ionic surface active agents, the solubility of which vary with the number of alkoxy groups. The alkylphenols may be reacted with aldehydes to produce phenolic resins; used in small quantities with other phenols in the preparation of phenolic resins, the alkylphenols serve to improve water resistance, oil solubility, and electrical properties. They also act as internal plasticizers. The reaction of alkylphenols with formaldehyde or with sulfur halides yields intermediates for lubricating oil antioxidants and detergents. Other products available through octyl- and nonylphenol include fungicides, germicides, rubber chemicals, pharmaceuticals, adhesives, and corrosion inhibitors. Octylphenol, in addition, stabilizes ethyl cellulose against deterioration by heat and light. Commercially available.

# **Triton** surface-active agents . . . the nonionic octylphenoxyethanol series

Nine surface-active agents, reaction products of ethylene oxide with octylphenol, are available. They have the following general formula:



and may be arranged in order of increasing number of ethoxy groups:

| Name | n | Name | n |
|---|---|---|---|
| OPE-1 | 1 | Triton X-102 | 12-13 |
| OPE-3 | 3 | OPE-16 | 16 |
| Triton X-45 | 5 | OPE-20 | 20 |
| Triton X-114 | 7-8 | OPE-30 | 30 |
| Triton X-100 | 9-10 | | |

The solubility in water of these surface-active agents varies from relative insolubility (OPE-1 through Triton® X-45) to excellent solubility (higher members) over a wide temperature range in hard water and brine. The products designated OPE-1 through Triton X-102 are somewhat viscous, light-colored, 100 percent active liquids. OPE-16, OPE-20, and OPE-30 are waxy solids at room temperature, and to facilitate handling are supplied as 70 percent aqueous solutions. All of the materials are stable in acid and mild alkali and do not interact with cationic or anionic surface-active agents.

The OPE series of surface active agents are useful as wetting agents, emulsifiers, detergents, and wherever reduction of surface tension or interfacial tension is desired. Selection of the appropriate agent for any application, naturally, depends upon the characteristics of the system. In general, the diversity of the series should make it possible to select one or more products which will fulfill almost any need for a surface-active agent. Commercially available.

---

# Other Rohm & Haas Products:

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PARAPLEX® polyester laminating, casting, and molding resins

PLEXIGLAS® acrylic plastic sheet and molding powder

RHOPLEX® acrylic emulsions for coatings and textile finishes

TRITON® surface active agents

Coatings resins

Disinfectants and sanitizers

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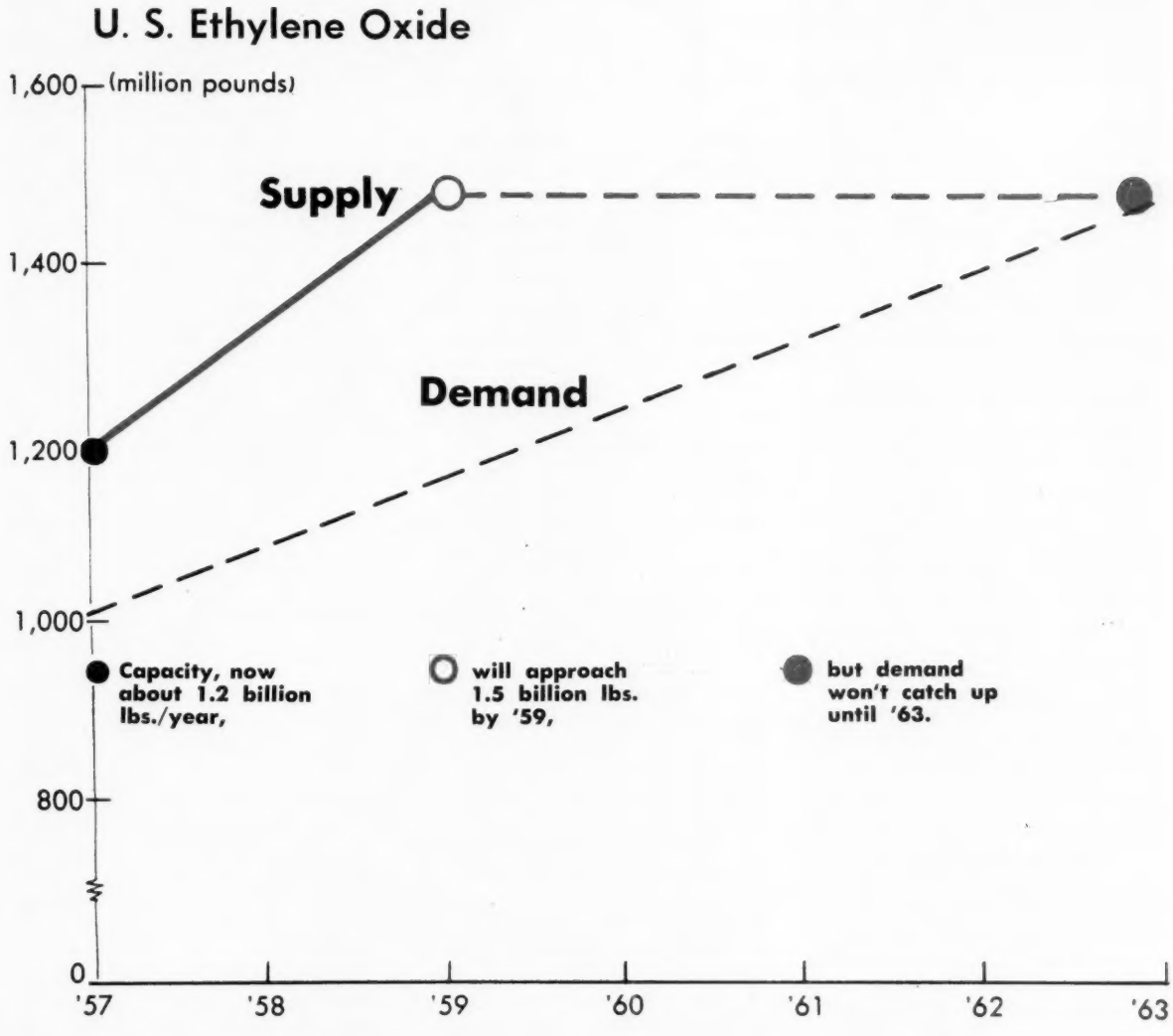


# Oxide Demand: Six Years to Catch Up

**By 1959, U.S. ethylene oxide** capacity will climb to about 1.5 billion lbs./year. That's some 300 million lbs. higher than the anticipated demand for that year. More significant, though—and a likely source of concern for current and potential producers—is that ethylene oxide needs, while growing steadily, may not completely absorb the forthcoming overcapacity until '63.

Some 300 million lbs./year of new capacity now on the way is split about evenly among four established producers and one newcomer. Two new plants are scheduled for completion this year.

**Coming This Year:** General Aniline will throw the switch, late in '57, at an $8-million, 60-million-lbs.-a-year plant at Linden, N.J. GAF's ethylene oxide (to be made by direct oxidation) will be used primarily to make detergents and surfactants. The new plant will also be equipped to manufacture ethylene glycol (antifreeze, industrial, fiber grades) and diethylene glycol. (Ethylene will be piped from Esso Standard's Bayway refinery and, presumably, the latter firm will buy much or all of GAF's glycol.)

Also due onstream before the end of this year is Wyandotte's 60-million-lbs./year, direct-oxidation plant at Geismar, La. This unit will have about twice the capacity of the company's chlorhydrin-process plant at Wyandotte, Mich. Much of the ethylene oxide will be used to make detergents and antifreeze, but a spokesman says, "We are taking a long,

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# New ethylene oxide units will bring total U.S. capacity to 1.5 billion lbs. by 1959.

| | | Productive Capacity (million lbs./year) Direct Oxidation | Chlorhydrin |
|---|---|---|---|
| Allied | Orange, Tex. | 35 | |
| Carbide | S. Charleston, W. Va. | 30 | 90 |
| | Texas City, Tex. | 150 | |
| | Whiting, Ind. | 70 | |
| | Institute, W. Va. | 70 | |
| | Seadrift, Tex. | 205 | |
| | Torrance, Calif. | 50 | |
| Calcasieu | Lake Charles, La. | 57 | |
| Dow | Midland, Mich. | | 20 |
| | Freeport, Tex. | | 220 |
| | Plaquemine, La. | | 60 |
| General Aniline | Linden, N. J. | 60 | |
| Jefferson | Port Neches, Tex. | 60 | 110 |
| Mathieson | Doe Run, Ky. | | 100 |
| Wyandotte | Wyandotte, Mich. | | 30 |
| | Geismar, La. | 60 | |

hard look at polyethylene glycols, glycol ethers, and ethanolamines; and by the time the new plant gets its shakedown run, we may be ready to make at least some of these other products."

. . . **and in '58:** Dow's 60 million lbs./year of new ethylene oxide capacity at Plaquemine, La., which should be in operation in the spring of '58, will boost the firm's total oxide output to an estimated 300 million lbs./year. Of the five producers now building new plants, Dow is the only one still sticking to the older chlorhydrin process.

A new name on the nation's ethylene oxide roster is Calcasieu Chemical. Construction of an $11-million petrochemical plant at Lake Charles, La., is now getting under way; it's scheduled for completion in early '58. Item: Calcasieu's stockholders include Sears Roebuck and Co., Mineral Solvents (Chicago), Cities Service and Continental Oil, co-owners of Petroleum Chemicals, Inc., Petroleum Chemicals will engineer, build, operate and supply ethylene (as raw material) for the new plant.

Calcasieu's announced capacity is 8 million gal./year of ethylene glycol, which spells a demand of close to 60 million lbs./year of ethylene oxide. Company officials say the new plant's rated capacity is 57 million lbs./year of ethylene oxide.

And there's no secret about what Calcasieu will do with its ethylene glycol. All of the firm's stockholders market antifreeze solutions, and all will take a share of the total output.

Fifth in line in the current crop of ethylene oxide expansions is Jefferson Chemical's 60-million-lbs./year capacity boost at Port Neches, Tex., for which first construction contracts were signed a few weeks ago. Jefferson now has a 110-million-lbs./year plant, also at Port Neches, that utilizes the chlorhydrin process, but the new plant will mean a partial switch to direct oxidation.

About 70% of Jefferson's ethylene oxide output currently goes into captive uses, and about 50% of the total oxide is converted into glycol. When the new plant is completed, the firm's total ethylene glycol output will increase by about 50%. But this boost will not make use of all the upcoming total capacity of 170 million lbs./year. Plans now call for a

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## Expanding outlets up ethylene oxide demand

| End-Use | Demand | | | |
|---|---|---|---|---|
| | 1950 | 1955 | 1960 | 1965 |
| Ethylene glycol | 312 | 585 | 760 | 950 |
| Nonionic surfactants | 25 | 95 | 135 | 250 |
| Ethanolamines | 26 | 65 | 130 | 170 |
| Polyethylene glycols | 35 | 80 | 110 | 140 |
| Acrylics | 26 | 52 | 70 | 80 |
| Glycol ethers | 26 | 33 | 45 | 60 |
| Totals | 450 | 910 | 1,250 | 1,650 |

switch of some of the old capacity to production of propylene oxide.

**Ifs and Buts:** Current estimates of the supply/demand picture shaping up for the coming years are of necessity based on known expansions. Not to be overlooked, however, are possible developments that may either further aggravate the overcapacity problem or, on the other hand, ease the situation long before 1963.

For example, it's quite possible that still more capacity will come in before '63. It's no secret that Commercial Solvents, for one, has been actively exploring the feasibility of going into ethylene oxide production. But how the answers now look to the firm's planners hasn't been made public.

The question as to whether Rohm & Haas will join the roster of ethylene oxide makers has been, for some time, a lively topic of speculation among oxide market followers. Some are convinced that the company has such plans in the works, while others discount the trade talk, describe it as a typical customer's maneuver to obtain more favorable prices from established sellers to whom lower profit margins would still pay off if they discouraged new producers from entering the field.

*CW* posed the pertinent question to Rohm & Haas officials. The answer? The company won't confirm or deny the reports that it is planning oxide production. At any rate, an R&H ethylene oxide plant—if it's built at all—will probably be a far-future project.

Periodically, talk filters through trade channels that other companies (including at least one oil company) may get into the business in the near future. Although most of these reports, to date, are being discounted as highly suspect, much admittedly can happen in the next five years that would lend credence to these hints. If newcomers do appear on the scene, they will—all other factors being the same—tend to aggravate the already sizable overcapacity.

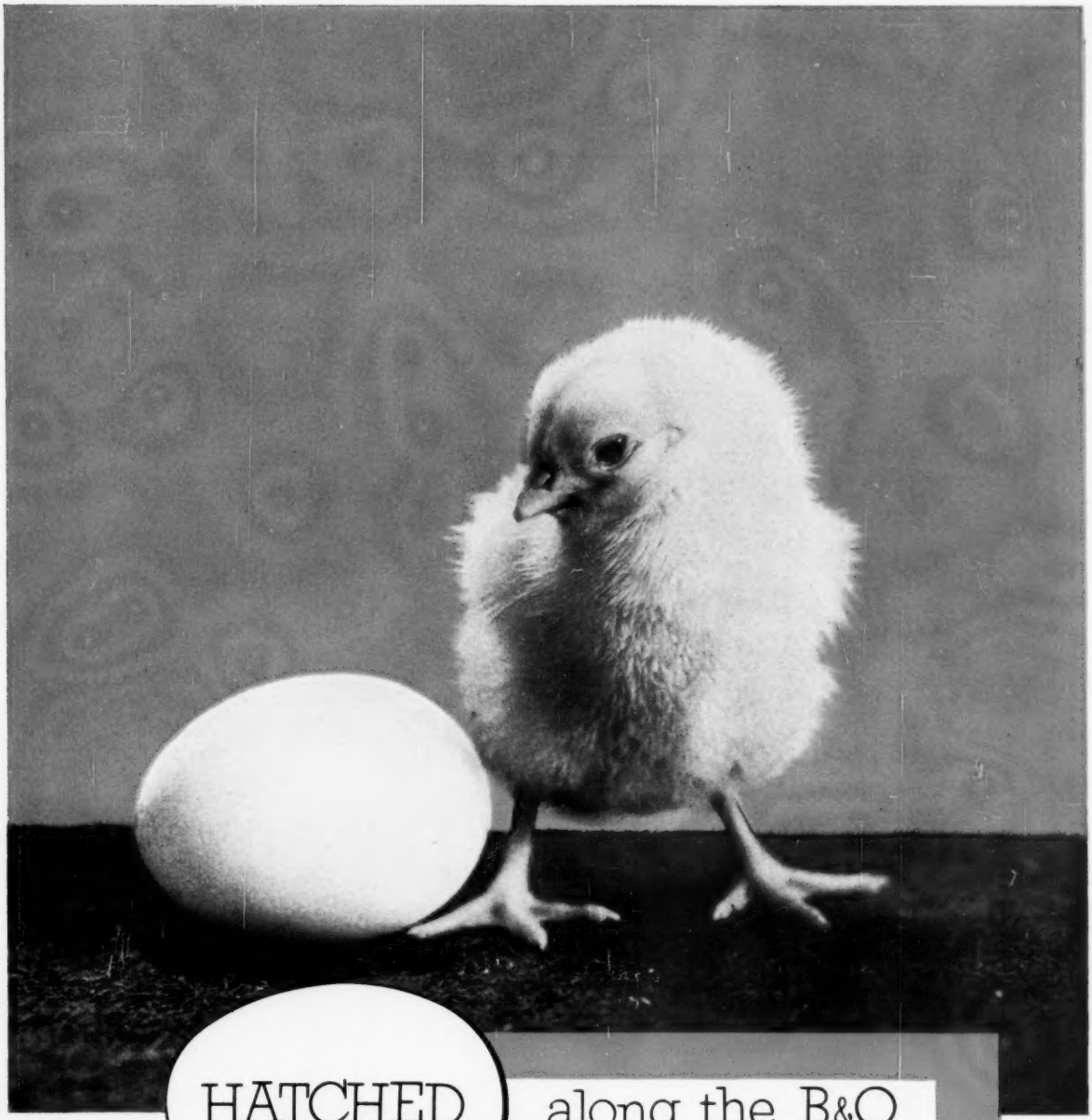
On the other hand, there are distinct possibilities that ethylene oxide demands for certain applications may grow faster than heretofore anticipated. An element of doubt is created by a hard-to-predict consumer response to products now fighting for new markets.

Considerable hope is placed by some on the potential growth of polyethers (*CW, Jan. 26, p. 72*) in the manufacture of polyurethanes. The more optimistic marketers see a big growth in this field; if true, much of the current overcapacity of ethylene oxide could disappear faster than is generally expected.

How fast ethylene oxide-derived surfactants will grow is also a point of considerable conjecture. If consumption of liquid detergents continues to increase as rapidly as during the past five years, some market researchers will have to revise upward their estimate of ethylene oxide needed for this end-use.

There's talk, too, that ethylene oxide is finding a new outlet as an auxiliary power source in missiles and in jet engine starters. But there are no hints on the potential size of such a hush-hush market.

The ethylene oxide picture, as a whole, is obviously racked into soft focus by many "ifs" and "buts", although some factors stand out sharply



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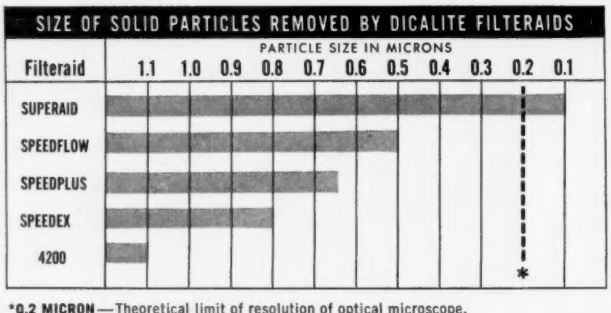
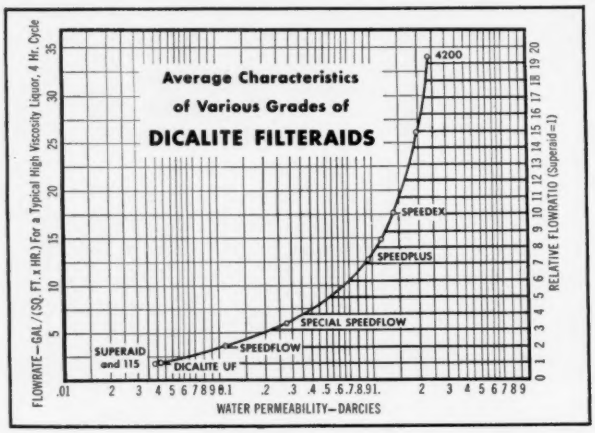



*0.2 MICRON—Theoretical limit of resolution of optical microscope. Few microscopes achieve it.
80.0 MICRONS—Smallest particle size visible to the unaided eye at 10″ distance.

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and provoke little or no debate among the industry's market experts.

**Glycol Gush:** Ethylene glycol is, of course, the most important product made from ethylene oxide. Annual consumption of oxide for this purpose during the past few years has been running well over 300 million lbs. higher than for all other uses combined (*see chart, p. 80*). It will likely maintain a comparable margin until at least '65.

According to the best available market evaluations, the next three fastest-growing outlets for ethylene oxide, in order of importance, are nonionic surfactants, ethanolamines (*CW, Nov. 24, '56, p. 86*), and polyethylene glycols.

Ethylene oxide consumption in the manufacture of glycol ethers and acrylics will also continue to grow, but the demand for acrylonitrile will increase more slowly than was formerly anticipated because sizable quantities will be made from acetylene instead of ethylene oxide.

All factors considered, total consumption of ethylene oxide in the U.S. can be expected to climb steadily, at an average annual rate of more than 80 million lbs./year, for at least the next six years. During that period, the current overcapacity will gradually be absorbed. All that established and incoming ethylene oxide producers will need, obviously, is patience.

## Good News for Soapers

**Soap and detergents** makers both should be feeling good. Reason: the Sales Census of the Association of American Soap and Glycerine Producers shows that sales of both materials are on the upswing. The report, which covers the first three months of '57, contained these highlights:

Total soap and detergents sales amounted to 1,032,550,000 lbs. (value $247,685,000) for the first three months of the year. This is a tonnage increase of 12% over the previous quarter and a healthy 2.6% boost over the same period last year. Dollarwise, the increase is even bigger: total sales were 17.2% ahead of the fourth quarter of '56 and 9.9% above the first quarter of '56.

Soap sales, showing signs of recovery from a slide, headed upward for the first time since '51. Total

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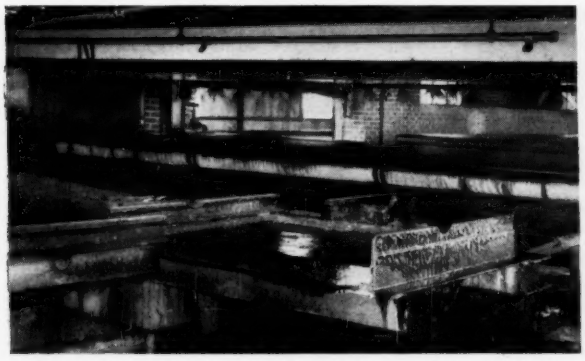
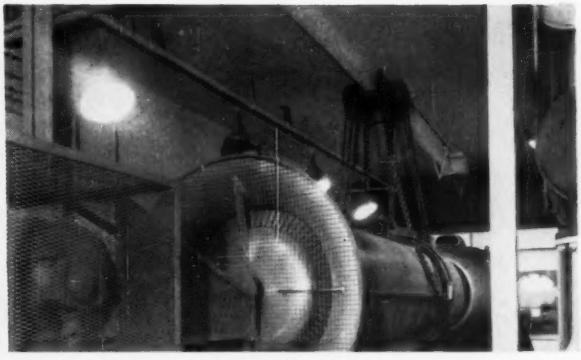
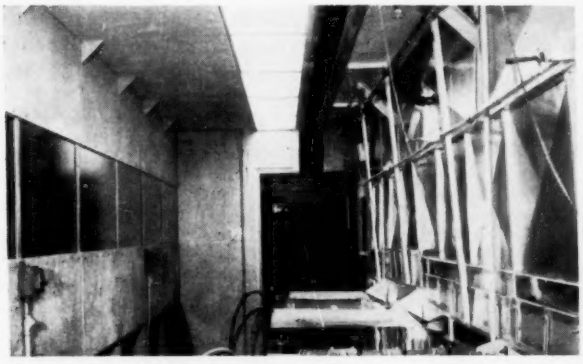


**WATER SPRAY PROTECTION** Asphalt coating machine at Alabama Pipe Company, Anniston, Ala., has a Grinnell ProtectoSpray System.



**AIR FOAM PROTECTION** Engine test cell at Trans World Airlines, Inc., Kansas City, Mo., is protected by a Grinnell ProtectoFoam System.



**DRY CHEMICAL PROTECTION** Hot oil dip tanks at Royal Canadian Air Force Supply Depot, Namao, Alta., has a Grinnell dry chemical installation.

**CARBON DIOXIDE PROTECTION** Record storage vault at West Penn Power Company, Greensburg, Pa., uses a Grinnell carbon dioxide installation.

Remember, extra hazardous areas, where special protection must be provided to insure against possible serious loss by fire, are fairly commonplace in industry today. Illustrated here are a few of these, along with the fire protection systems recommended to arrest fire. But there are many others, where major or minor supplements to ordinary-hazard fire protection systems are necessary, if trouble is to be averted.

With a full range of equipment, you can rely on Grinnell to give you unbiased recommendations on the system best suited to your requirements. Remember, too, the installation of the proper Grinnell System usually serves to reduce fire insurance premiums drastically, often pays for itself in a few years. So don't delay. For further facts, write Grinnell Company, Inc., 288 West Exchange Street, Providence, R. I. Branch offices in principal cities.

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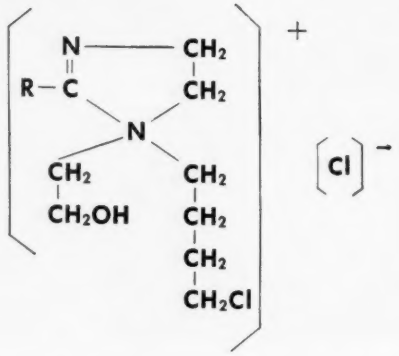

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## MARKETS

sales (solids and liquids) amounted to 315,076,000 lbs., up 6.5% over the fourth quarter of '56 and 1% ahead of the first quarter of last year. The dollar volume was $82,041,000, a rise of 10% over the previous quarter, and 11% ahead of the same period in '56.

Total synthetic detergent sales (solids and liquids) increased in tonnage some 14.6% over the previous quarter, hit 717,474,400 lbs. This is 3.4% better than the first quarter of last year. In dollars, this represents $165,640,000, a climb of 21% over the fourth quarter of last year and 9.6% ahead of the first quarter of '56.

A breakdown of sales of products by category in the first quarter of '57:

| | Pounds thousands | Dollars thousands |
|---|---|---|
| Total sales | 1,032,550 | 247,685 |
| Total soaps | 315,076 | 82,041 |
| Total syndets | 717,474 | 165,644 |
| Solid soaps & syndets | 949,191 | 217,516 |
| Liquid soaps & syndets | 83,359 | 30,169 |
| Solid soaps | 307,709 | 80,438 |
| Solid syndets | 641,482 | 137,078 |
| Liquid soaps | 7,367 | 1,603 |
| Liquid syndets | 75,992 | 28,566 |
| Toilet bars | 134,881 | 44,334 |
| Laundry—white | 38,529 | 7,228 |
| Laundry—yellow & other | 12,371 | 1,410 |
| Chips—packaged | 12,696 | 4,209 |
| Chips—bulk | 25,911 | 3,106 |
| Granulated—packaged | 46,119 | 12,473 |
| Granulated—bulk | 21,810 | 2,606 |
| Washing powder—packaged | 700 | 104 |
| Washing powder—bulk | 3,133 | 275 |
| Hand pastes & powders | 3,002 | 436 |
| Pastes & jellies | 4,017 | 529 |
| Shaving soap | 788 | 522 |
| Shaving cream | 3,358 | 3,136 |
| Miscellaneous | 394 | 70 |
| Soap shampoos | 184 | 209 |
| Detergent shampoos | 5,072 | 4,786 |
| Detergent shampoos-solid | 3,304 | 2,095 |
| Detergent shampoos-liquid | 1,768 | 2,691 |

# Fluor Awarded Contract for American Oil Sulfur Recovery Plant

American Oil Company has awarded a contract for the construction of a gas treating and sulfur-recovery plant to The Fluor Corporation, Ltd. The new unit is part of American's new $35,000,000 Yorktown, Va. refinery.

The plant design calls for the processing of hydrocarbon and sulfur bearing waste refinery gases. The sulfur yield, estimated at 50 tons per day, will be stored in heated, liquified form prior to tank car shipment. Hydrocarbon gases will be piped back into the refinery to provide fuel for other processes. Construction of the project will begin in mid-year, with completion scheduled for December, 1957.

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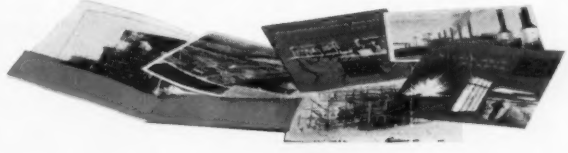
## American Oil: *another contract awarded to Fluor*

With the construction of the sulfur-recovery plant mentioned above, American Oil Company joins a long list of satisfied Fluor customers.

For over 65 years, contracts awarded to The Fluor Corporation, Ltd., have proved to be sound investments. Plants and refineries now operating throughout the world are an endorsement of Fluor's ability to design, engineer, and construct facilities noted for profitable operation, outstanding design, and minimum maintenance.

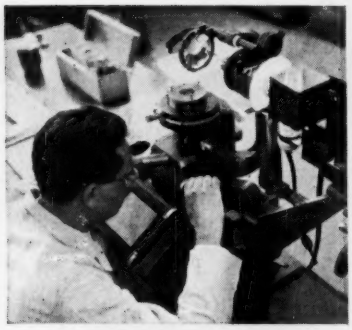
You can investigate Fluor's recent projects in the petroleum field. Simply write, indicating your specific interests. A special portfolio of informative photographs and descriptive literature will be mailed immediately.



**FLUOR** *ENGINEERS AND CONSTRUCTORS for the Petroleum, Chemical and Power Industries*

*The FLUOR CORPORATION, Ltd., Los Angeles – Mid-Continent Division, Houston – Research Division, Whittier, California – Fluor of Canada, Ltd., Toronto – Singmaster & Breyer, Inc., New York City*

# OWENS-ILLINOIS ASSURES YOU A



**Co-ordinated Research**

*Pure research* into formulae and fabrication of glass, *packaging research* into processing and handling methods in customer plants, and *market research* into consumer attitudes, add up to greater specific value for your packaging dollar.

**Engineered Design**

The package that takes your product to market must take *three* needs into account. Considerations of its function in the retail store, its operating efficiency and its consumer utility all become a part of the prescription for an Owens-Illinois package.

**The Right Container**

Facilities at Owens-Illinois are versatile. Talents are varied and many. So you can count on obtaining a container exactly suited to your needs—one that blends salesmaking beauty, product protection and utility in the proportions required to attract customers.

# Battery Acid, Tire Cleaner or Auto Polish—

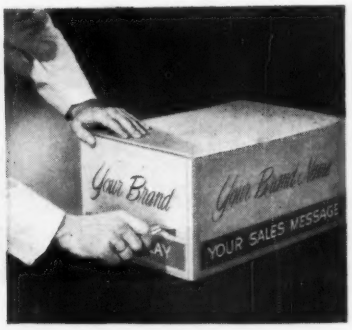
# COMPLETE PACKAGING APPROACH

### The Right Closure

Know-how as to the best available liner and closure—best for packing, displaying, or using a specific product—may well be one of the most important single points through which expert packaging counsel will reward you many times over.

### Needed Fitments

With emphasis on the word "needed," Owens-Illinois specialists are keenly aware of sales benefits possible through use of plastic shaker and pour-out fitments which are not "gadgets" but which increase consumer satisfaction with your product.




### Merchandising Cartons

Modern cartons are developed only through systematic consideration of their opportunity to serve you in the retail store and retail warehouse as well as on your own filling line and in transit. Owens-Illinois is pioneering such developments.

# you can ride to greater sales...

## *with an Owens-Illinois package that sells through convenience in use*

It's a well known fact that in addition to a good product one secret to greater sales is a well designed and engineered glass package.

Glass does more than let customers see what the product looks like. It adds a sparkle and eye-catching appeal to packages displayed in the store. An attractive, easily recognized package means more repeat sales, too.

In addition, a glass package protects the contents, shows the supply available and maintains good quality throughout many openings and closings. There's no waste or spoilage, either. A distinctively designed glass package can give your advertising campaign a tremendous boost.

Market-minded designers at Owens-Illinois will help you plan a well styled glass container with a powerful merchandising appeal all of its own. Owens-Illinois can provide glass containers of all types, capacities and designs.

DURAGLAS CONTAINERS
AN (O) PRODUCT

**OWENS-ILLINOIS**
GENERAL OFFICES • TOLEDO 1, OHIO

USCOWELD PLASTIC PIPE FITTINGS

## Greater Joint Strength—Faster Insertion—Thanks to

# THE ONLY SOLVENT-WELD FITTING WITH AN INTERFERENCE FIT!

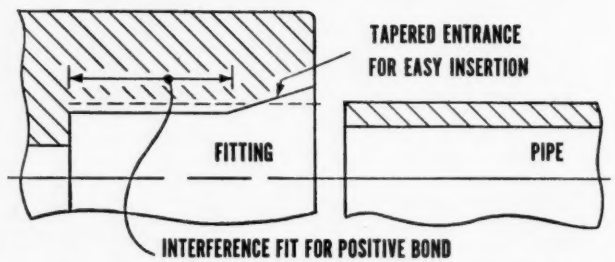
To get maximum joint strength, interference fit is a must! UscoWeld fittings are designed to provide at least a .005 inch *interference fit.* And UscoWeld fittings are a cinch to install because of a specially designed *tapered entrance socket.* U. S. Rubber has developed the unique UscoWeld fitting of the same tough, lightweight, corrosion-resistant thermoplastic as famous Uscolite® CP plastic pipe.

All UscoWeld fittings can safely handle the pressures recommended for the corresponding size of extra-heavy Uscolite pipe. Maximum recommended operating temperature is 170°F. Pipe can be cut to exact length, is easily installed in close quarters.

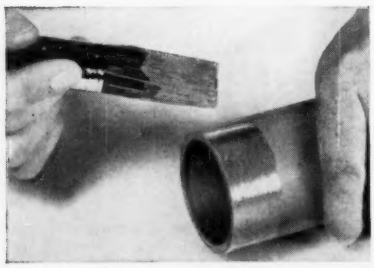
Obtainable at any of our 28 District Sales Offices, at selected distributors, or write us at Rockefeller Center, New York 20, N. Y.

In Canada, Dominion Rubber Co., Ltd.

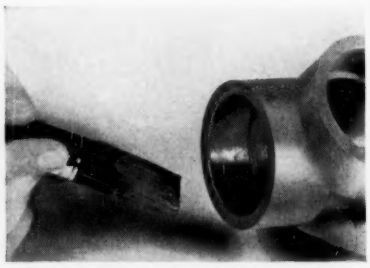
### THE USCOWELD PRINCIPLE



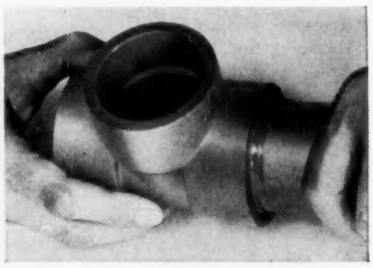

By combining tapered entrance socket and a .005 inch interference fit—even when the pipe is at the small limit of the diameter tolerance and the fitting at the large limit of its diameter tolerance—UscoWeld is easily installed, and the strongest solvent-weld joint available.



Apply Uscolite CP cement to the outside area of the pipe that is to be in contact with the socket.



Next apply cement uniformly to entire inside area of *tapered entrance* socket.



While both cemented surfaces are still wet, insert pipe in fitting and push until pipe bottoms against shoulder in the fitting.

### ADVANTAGES

- fast, easy to assemble—tapered entrance provides easy insertion of pipe
- strong joint—interference fit provides for optimum fusion of pipe and fitting into homogeneous mass; joint strength not dependent on cement alone
- automatic alignment of pipe and fittings
- chemical resistance of the UscoWeld joint is the same as for Uscolite pipe
- UscoWeld takes maximum advantage of the inherent "solvent-weldability" of plastic pipe and fittings
- no threading required—just cut pipe square
- not necessary to allow for thread make-up variation—pipe can be cut to exact lengths
- easy to install in close quarters
- resists fatigue due to vibration or thermal stresses by elimination of stress concentration at thread roots.

Mechanical Goods Division

# United States Rubber

# Technology
## Newsletter

CHEMICAL WEEK
June 15, 1957

**The scanty literature on the Henkel process**—the terephthalic acid process being piloted by Hercules—is richer this week by one U.S. patent (U.S. 2,794,830). Moreover, the patent deals with one of the two versions of the process in which Hercules is interested. In it, an alkali metal benzoate (derived from toluene) is heated to a point between 340 C and its decomposition temperature. In an inert atmosphere, this is catalytically converted into the metallic salt of terephthalic acid. That, in turn, is sprung to the free acid.

The other version of the Henkel process deals with the isomerization of phthalic acids through the alkali metal salts.

•

**Furfural may come from a new source** if present plans of Cumberland Corp. (Burnside, Ky.) go through. The firm dedicated its $3-million wood distillation unit last week. Initially, it's turning out charcoal briquettes, but says that "in the near future" it will be making furfural.

The firm was formed last year with just that project in mind (*CW Technology Newsletter, Dec. 17, '55*). Presumably, it will use a process (U. S. Patent 2,725,346) that exothermically decomposes sawdust to organic acids that catalyze the formation of furfural from pentoses present in larger pieces of wood. The furfural is taken off and the remaining wood heated above the exothermic decomposition point to form charcoal.

•

**U.S. Steel will effect a 25% increase** in its ferromanganese production. So it revealed this week as formal startup of Linde's big new oxygen plant (*see p. 92*) was announced.

The oxygen plant turns out 500 tons of oxygen per day. About 90% will be used at 95% purity to make ferromanganese; the remainder will be brought up to 99.5% for use in electric furnaces, cutting and scarfing torches, other applications.

In the ferromanganese production, the air blast will be enriched by 6% oxygen to speed up the smelting process. But the enrichment has to be carefully regulated; excessive heat might damage the furnace lining. Bonus from oxygen use: consumption of coke (normally 3,400 lbs./ton of ferromanganese) is reduced.

•

**The first gas concrete production unit in the U.S.** will begin operation July 1. The plant, with a capacity of 600 cu. yds./day of finished concrete, will use a Swedish process (*CW Technology Newsletter, Dec. 1, '56*). It is located in Denver, will be operated by U.S. Durox of Colorado.

William Chadwell, vice-president of Swedish-American Industries (the franchising agent for the process), reports that a contract has

been signed with a firm, American Durox, that proposes to make the material in the Dallas-Fort Worth, Tex., area.

**Codeine may yield to noscapine as an anticough remedy stand-by.** Formerly called narcotine, noscapine is an old drug that has recently undergone evaluation as a means of relieving coughs. Said Harry Anslinger, U.S. narcotics commissioner, "Noscapine is as effective for cough relief as codeine, the long-recognized standard for anticough remedies; and its dose may be increased without undesirable effects."

Anslinger also pointed out that more than 25% of all medicinal narcotics usage in the U. S. is for cough remedies and prescriptions.

•

**New insight into Firestone's polymerization catalyst system** (*CW Technology Newsletter, Nov. 19, '55*) may be provided by two new Australian patent applications (22,560/56 and 22,559/56). They deal with polymerizing butadiene or copolymers of isoprene with butadiene and styrene by means of "lithium dependent catalysts."

•

**Custom processing is Eastman Chemical's latest gambit.** The firm has set up an organization to handle acetylations, aldol condensations, anhydride formation, hydrogenations, dehydrogenations, dehydrations, esterifications and oxidations. Work will be done in Eastman's Kingsport, Tenn., plant's existing facilities, although the firm says it will consider installation of new facilities "in special cases."

•

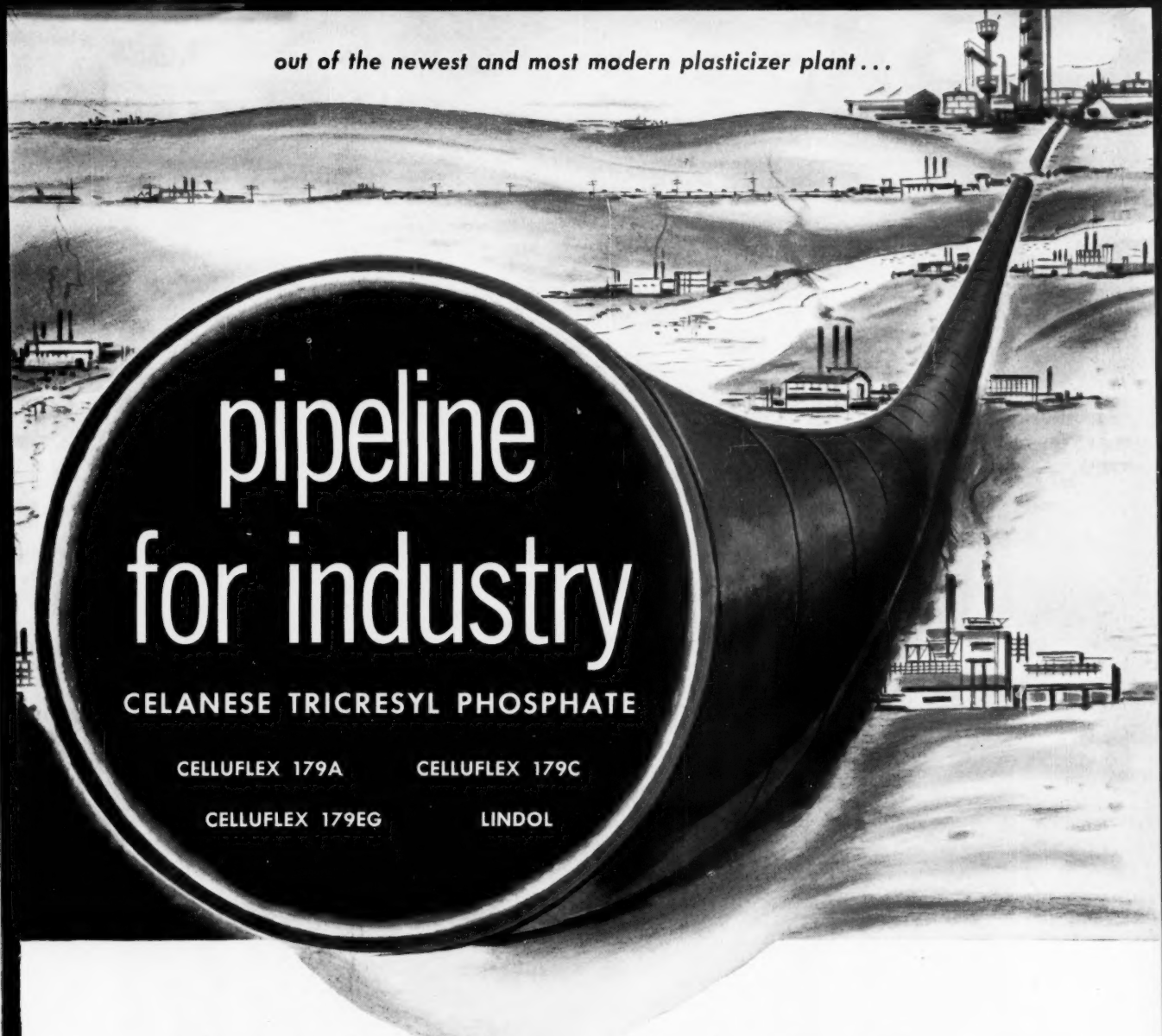
**Electrolytic deposition of metallic borides and silicides** was described at the Seattle meeting of American Institute of Chemical Engineers this week. R. W. Moulton and Harold Fullam, of the University of Washington, revealed that their work, although not yet at the pilot level, had progressed to a stage where they could specify the size of equipment needed in such an operation.

By electrolyzing fused salt mixtures, they found it possible to deposit out titanium, zirconium, thorium or chromium borides and titanium, zirconium or molybdenum silicides.

•

**Imaginative thoughts on future natural resource development** were expressed by Chancellor Clifford C. Furnas, of the University of Buffalo, at the national convention of American Society of Civil Engineers last week. Furnas hypothesized a large nuclear power plant built near the seashore that would produce electric power, liquid fuel (by "photochemical reactions of neutron and gamma radiation on carbon dioxide and water or similar materials"), fresh water from sea water (by utilizing waste heat from the reactor), and extract valuable minerals from the sea.

Admittedly, such a plan would call for some complicated apparatus, some of which "we cannot visualize as yet." Said Furnas, however: "The laws of nature and our technical competence might very well permit us to carry out such a consolidated operation on a practical basis."

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**CELLUFLEX 179A** contains lowest ortho content commercially available

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**CELLUFLEX 179EG** electrical grade especially developed for the wire and cable insulation industry . . . offers a high degree of volume resistivity

**LINDOL** lowest color Tricresyl Phosphate produced in commercial volume

Celanese
CHEMICALS

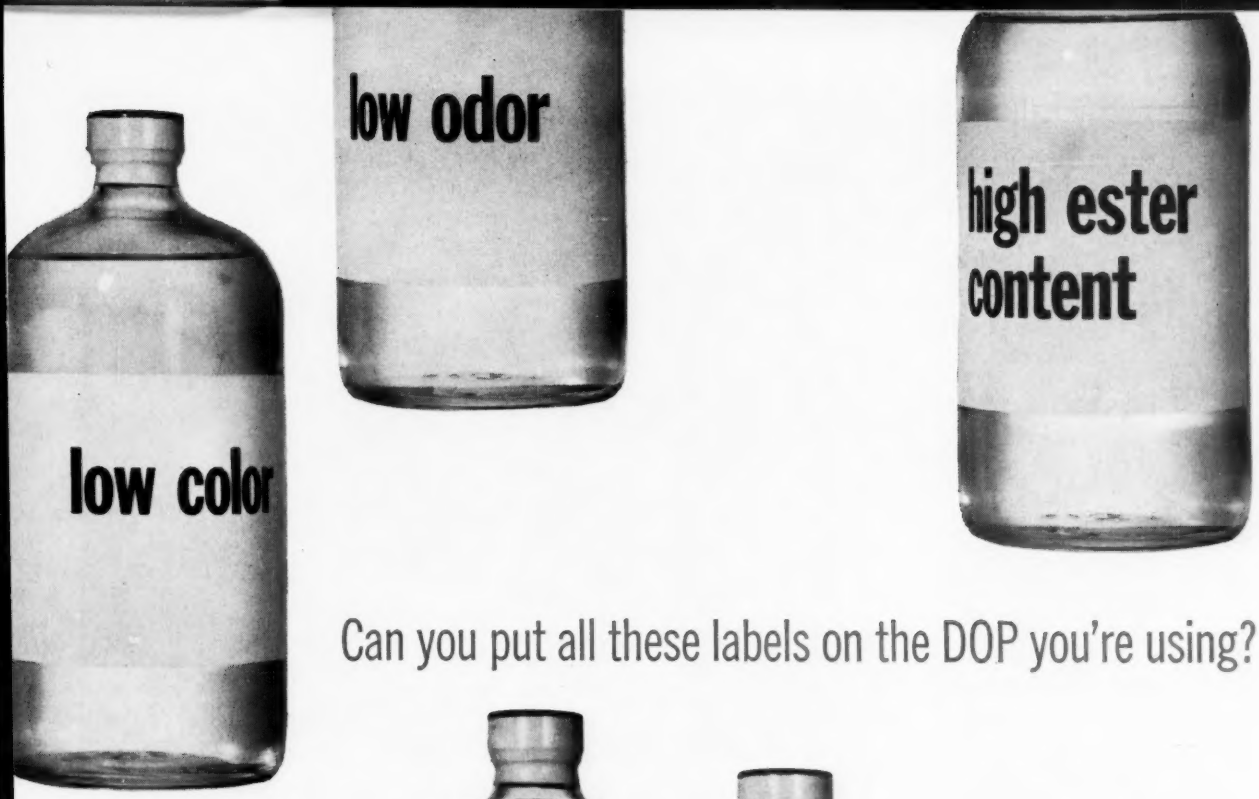
**Expanding oxygen plants like Linde's Belle, W.Va., unit are . . .**

# Keeping Up the Growth in Tonnage Oxygen

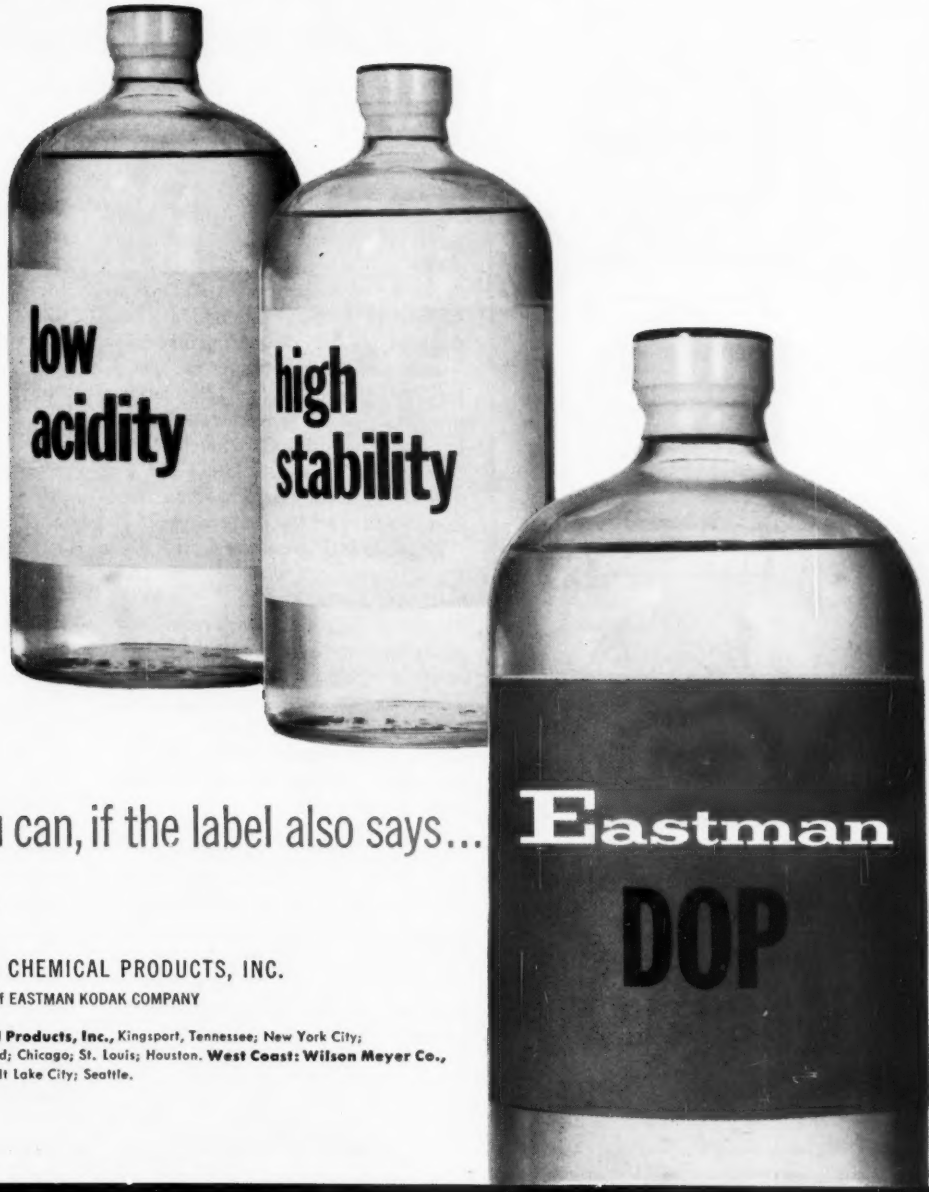
BUOYED UP by the chemical industry's swing to partial-oxidation processes and the steel industry's adoption of new steelmaking techniques, tonnage-oxygen production is maintaining a fast pace. A sixfold increase in the past decade boosted annual U.S. oxygen consumption from 12 to 17 billion cu. ft., still shows no signs of leveling off. Newest arrival on the tonnage oxygen scene: a 500-tons/day plant unveiled this week by Linde Co. and U.S. Steel Corp. at the latter's Duquesne Works (Duquesne, Pa.).

The need for oxygen at Duquesne arose from the development of a new technique of economically increasing the output of ferromanganese blast furnaces. USS conducted full-scale tests on the use of oxygen for air enrichment in ferromanganese processing during the winter of 1954-55, established a requirement for 300,000 cu. ft./hour of 95% oxygen.

Emphasizing the need for new packages to fit new uses, Linde developed a flexible plant to match the Duquesne Works' requirements, supplies 70 million cu.




Can you put all these labels on the DOP you're using?




You can, if the label also says...

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Solvents arrive on time

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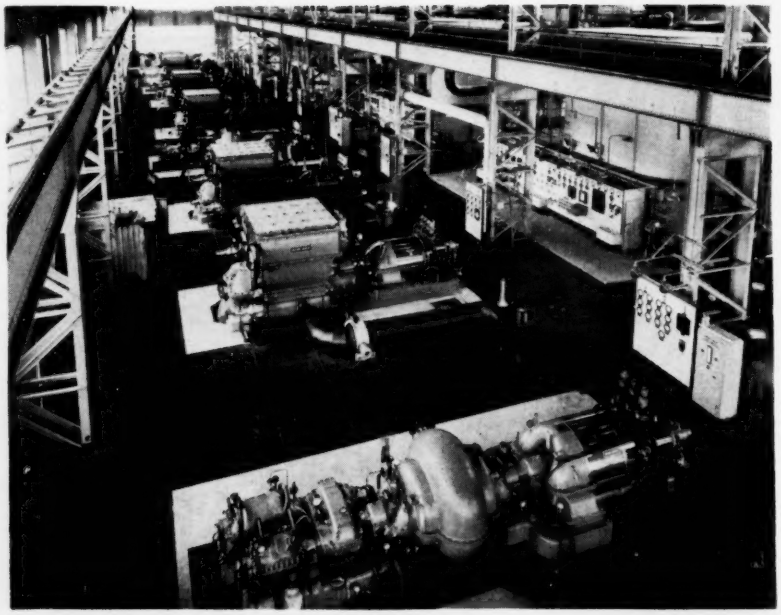

**Sasol plant's six oxygen generators turn out 1,800 tons/day.**

ft./month of high-purity (99.5% $O_2$) gas for normal mill operations, 10 million cu. ft. of high-purity liquid stand-by storage in addition to tonnage (95% $O_2$) output.

**Saving with Oxygen:** In addition to stepped-up furnace production rates, steel companies are eyeing other advantages made possible by the use of tonnage oxygen. New steelmaking techniques, such as oxygen top-blowing and the British Cyclosteel process (*CW, Jan. 26, p. 94*), hold out the promise of shortening the route from iron ore to steel by using oxygen.

In chemical processing, reactions employing oxygen in place of air offer even greater advantages. From the standpoint of capital investment, oxygen affords savings by providing fast reaction rates in smaller-size equipment. And from the operating standpoint, it yields higher reaction temperatures, better flame-temperature control, fewer diluents to be separated from the product.

Of course, not all oxidation processes are suited to the use of oxygen in place of air. In the production of sulfuric acid, for example, too high temperatures in final stage would drive the reversible $SO_2$-to-$SO_3$ reaction in the wrong direction. And in several other processes, oxygen's advantages may be outweighed by other factors in an over-all economic evaluation.

Process economics, however, is often largely a question of local conditions, making it a toss-up between air-oxidation and an oxygen process. In ethylene oxidation, for example, the three Shell process plants being built by The Lummus Co. (*CW, May 25, p. 64*) will employ oxygen. Scientific Design Co., on the other hand, has stuck with air oxidation in the ethylene oxide plants it has engineered, says it hasn't yet encountered conditions where oxygen would come out on top in over-all cost studies.

Biggest chemical application firmly in oxygen's camp: partial oxidation. These processes grew rapidly with increasing demands for large quantities of hydrogen for ammonia synthesis, are continuing to pick up backers. In addition to ammonia plants using the Texaco partial-oxidation process for the production of synthesis gas, even those that have a ready supply of hydrogen (from electrolytic cells, reformer off-gas) employ oxygen plants for the production of pure nitrogen. And acetylene production by the partial oxidation of natural gas has made rapid strides.

Largest U.S. oxygen plant is the 2,000-tons/day unit built by Hydrocarbon Research for Hidalgo Chemicals (now part of Amoco Chem-

*From Ore Bed to Finished Product*
*There's only one basic producer*

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IF IT'S A

***Borden*** ***Chemical***

IT'S GOT TO BE GOOD!



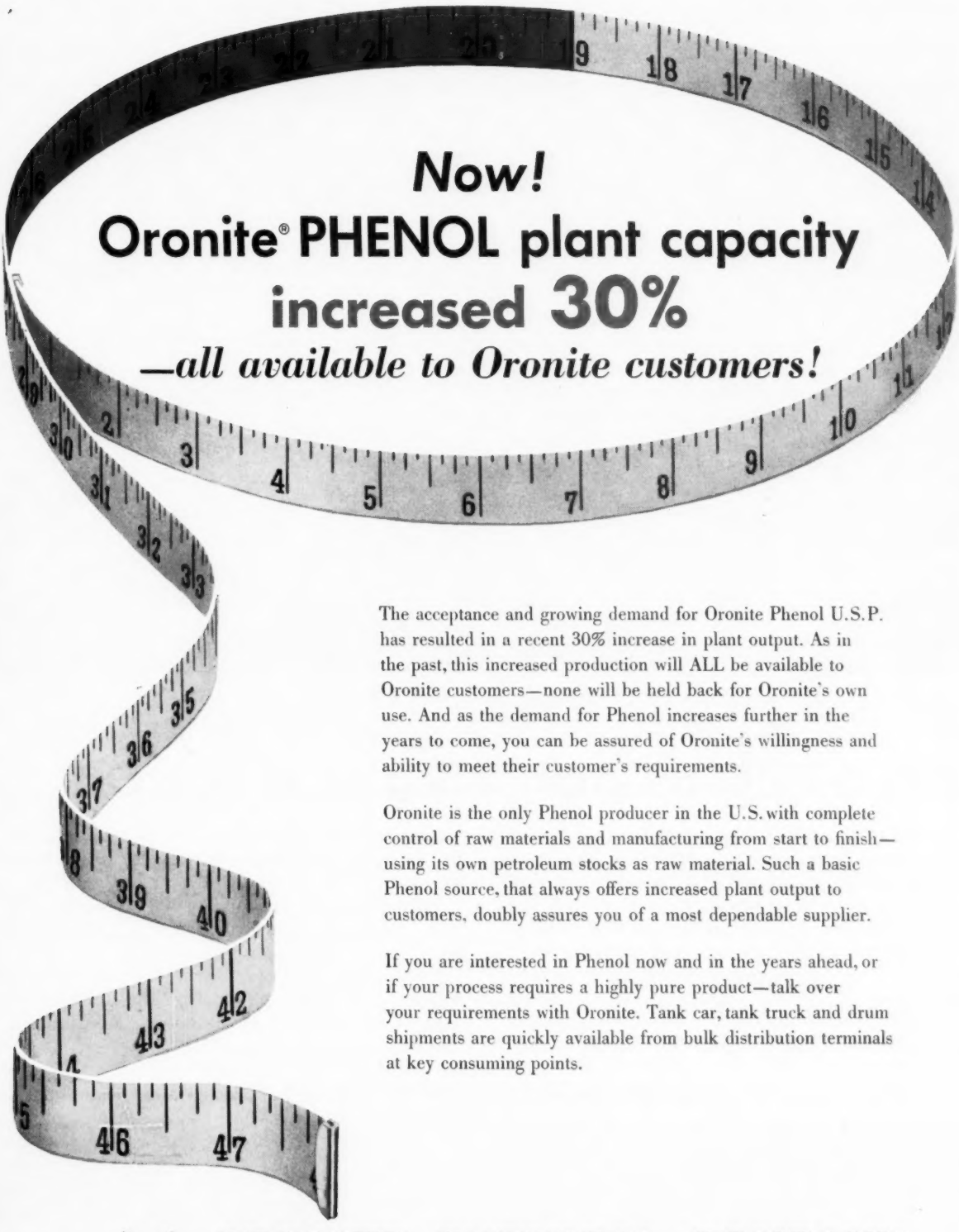
icals) at Brownsville, Tex. A fair match for size is the gasoline-from-coal plant built by M. W. Kellogg at Sasol, South Africa. Employing six German Linde air fractionation units, the Sasol plant produces 1,800 tons/day of 98% oxygen for the production of synthesis gas from lignite in nine Lurgi gasifiers.

**Matter of Size:** Though tonnage oxygen is still a long way from—and will probably never reach—the low $2/ton cost overoptimistically predicted 10 years ago, it's still a good buy. Present costs attainable by large oxygen plants range from $5/ton (under ideal conditions in a low-cost power area) to $10-12/ton. And several companies stand ready to engineer and construct, sell or lease oxygen plants or supply systems tailored to processing needs.

Linde, for example, offers six flexible package systems: cylinders for small-size or intermittent uses, cascade systems, Driox systems, physical producing plants backed up by a Driox system, combination plants supplying large quantities of low-purity (95-98% $O_2$) with side streams of high-purity gas and Driox backup, and large tonnage plants to provide continuously large quantities of low-pressure, low-purity oxygen. Linde is currently engineering a plant of the latter type for Du Pont's Belle, W.Va., plant. Scheduled for completion in mid-'58, the new unit will more than double Belle's present 360-tons/day oxygen capacity.

Putting in a plug for small-size plants, Air Products Co., which also handles everything from cylinders to large tonnage facilities, reports that plants using as little as 300 cu. ft. of oxygen per hour can make their own cheaper than they can buy it in cylinders. Minimum requirements for such an installation, says Air Products, are: fairly continuous operation (from Monday morning to Friday night, for example), relatively constant demand without too many peaks and valleys.

Air Reduction Co. and National Cylinder Gas Co. are also major producers of oxygen. Other firms offering tonnage plants: American Air Liquide, American Messer, Hydrocarbon Research Inc., and The Uhde Corp. (all of New York); Blaw-Knox (Pittsburgh); Independent Engineering Co. (O'Fallon, Ill.); Stacey Bros., div. of Dresser-Stacey Co. (Cincinnati); Superior Air Products Co. (Newark N.J.).



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4207

**Easy access to lignite (background) in Australian Valley sets stage as . . .**

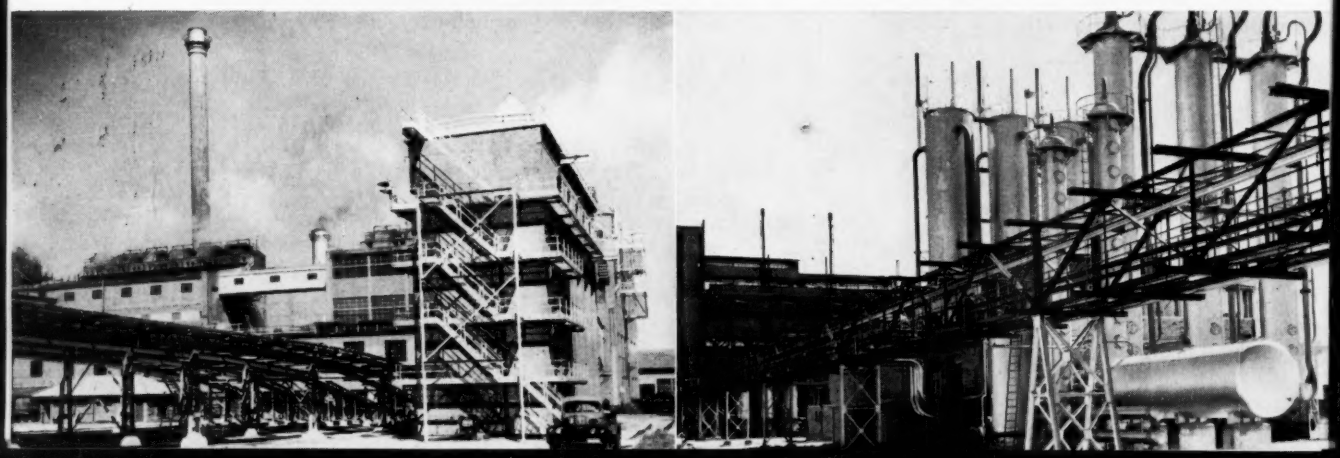
# $22.5-Million Gamble Begins to Pay Off

NEXT MONTH, Australians in the booming Latrobe Valley, where a 22-billion-ton lignite cache (mostly near the surface and easily mined) has sparked a fuel and power development program, probably will be too busy with new projects like the second 100,000-kw. extension of the Yallourn power station (*above*) to note that one of the program's early goals will have been reached. The $22.5-million state-owned Lurgi gasification process plant (*CW, Jan. 21, '56, p. 64*) at Morwell (*below, right*), opened last October at one-quarter capacity, will have hit full stride—15 million cu. ft./day of town gas for Melbourne, 100 miles to the west.

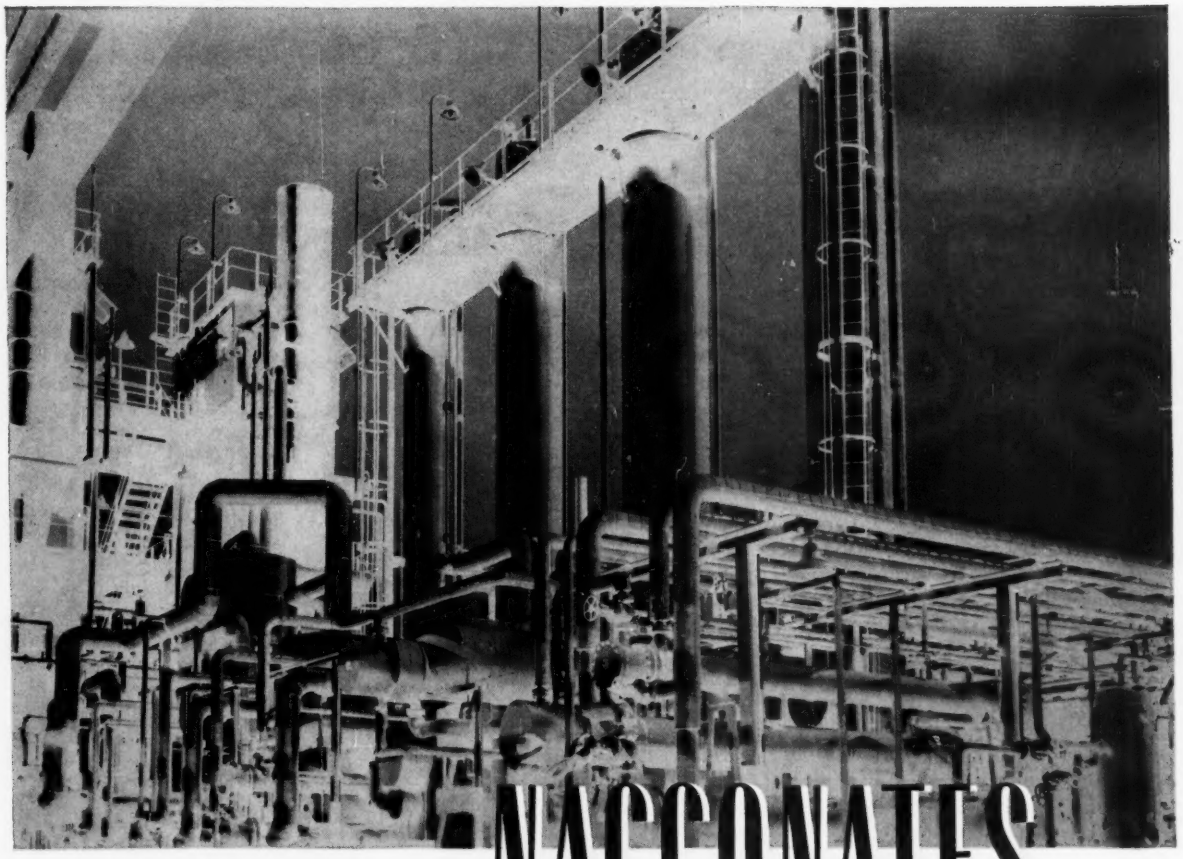
Plans call for doubling capacity by 1960, quadrupling by '64, eventually sidetracking part of its capacity into liquid fuels and chemicals production.

Early success of the plant justifies faith of Australian scientists who picked the Lurgi process after postwar tours of the only existing plants—in East Germany, now shrouded by the iron curtain.

**Ton-a-minute briquetting (left) prepares lignite for use in Lurgi gasification plant (right).**



# *Ready when you are!*



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## *for your present and potential urethane production*

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*Please mail me literature checked below:*

- ☐ Technical Bulletins I-17A to F on NACCONATES
- ☐ Application Data Sheet 41156—Flexible Foams
- ☐ Application Data Sheet 7956—Semi-rigid Foams
- ☐ Application Data Sheet 112356—Protective Coatings
- ☐ Interested in Literature only.
- ☐ Have representative call by appointment.

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E-14

**ALPCO Stafoam mixer speeds large-size urethane 'blows.'**

# Lift for Urethane Foams

**Until recently**, urethane foams were cut off from many promising applications by the lack of inexpensive, dependable foam-molding machines. But with the help of equipment manufacturers across the nation, the picture is changing. Today, suitable machines are available from a growing number of firms. Newest in the field: American Latex Products Corp.'s (Hawthorne, Calif.) portable Stafoam units.

A pioneer urethane developer, ALPCO got into the business in 1950 when it took over research and production of basic urethanes developed by Lockheed Aircraft Corp. (Burbank, Calif.). Soon after acquiring licensing agreements from basic producers Du Pont and Mobay, ALPCO looked into the machinery problem, decided it would have to develop its own molding equipment.

**Two Models:** The first of ALPCO's Stafoam machines is a small (3x4x5 ft.) unit, originally built for use in the University of California's physics laboratory. This machine features a central control panel that, ALPCO says, enables a semiskilled operator to adjust all necessary pressures, temperatures and flow without making adjustments inside the unit.

ALPCO's second model is a completely portable machine weighing in at about 450 lbs. For easy handling and setting up anywhere on the production line, the portable machine is made in eight units that can be moved about easily by two men. Both models can produce foams of virtually any density above 1.5 lbs./cu. ft., at rates of 5-25 lbs./minute, says ALPCO, can control foams to within one gram of desired density.

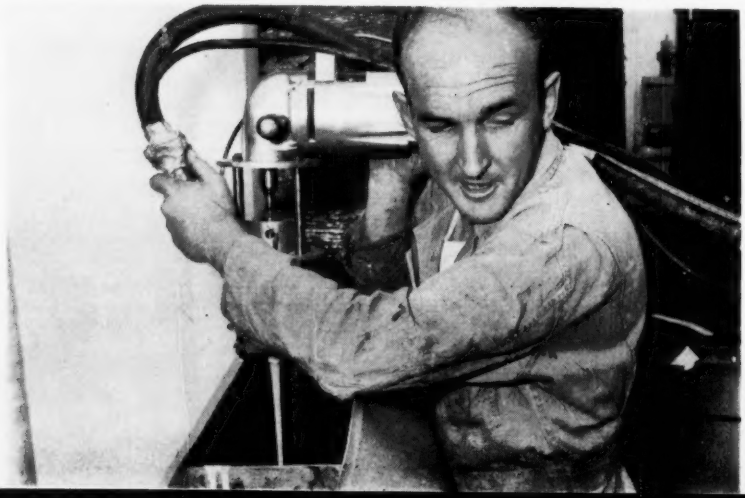
**Urethane Uses:** A major incentive for the development of small, versatile foaming machines was the diversification of applications requiring only low foam-production capacity. Early equipment imported from Germany was expensive ($60,000 - 90,000), had high capacities (30-40 lbs./minute) and couldn't be converted readily from one type of foam to another without a long and costly down-period.

Among the leading manufacturers to come up with small versatile units:

- Gabriel Williams Co. (Freeport, N. Y.) offers two standard models that produce 8-15 lbs./minute of foam of any type or density above 1.2 lbs./cu. ft.
- Newton Tool & Mfg. Co. (Wenonah, N. J.) makes machines featuring a mixing head that delivers foam intermittently. Developed by Du Pont, this head incorporates a self-cleaning blade to prevent clogging between applications. Nopco Chemical Co. (Harrison, N. J.), which also produces the chemical components for foams, offers these mixing heads combined with metering devices of its own design for lease to customers.
- Other firms interested in small foaming machines include Don Selby Associates (Wilmington, Del.) and Applied Engineering Associates (Brooklyn).

Some of the leading commercial uses of urethane foams now—or soon to be—in production: crash pads for Ford and Plymouth cars, mattresses, trailer truck insulation (in a recent test of truck insulating materials, urethane topped Fiberglas and Styrofoam), buoyant filling for ship bulkheads and wall insulation for office buildings.

**Foaming is a one-man job with unitized, portable equipment.**

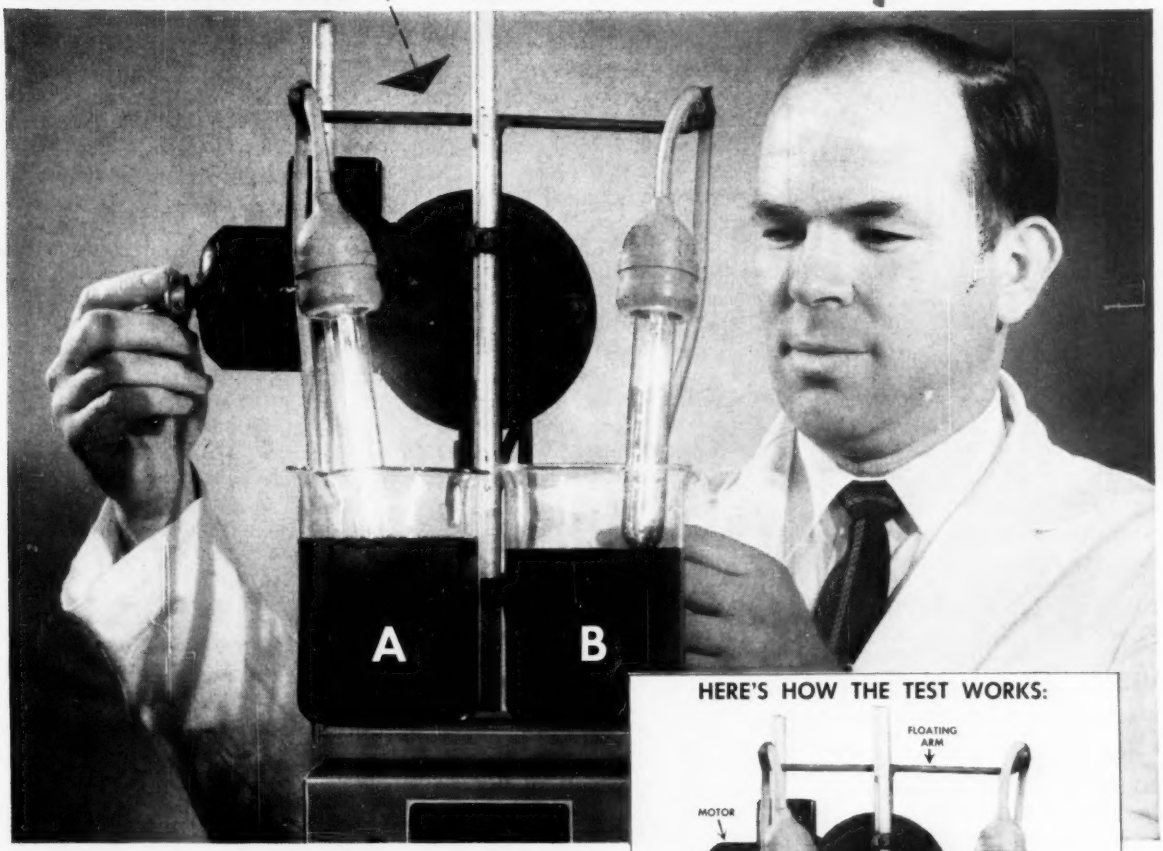


## EQUIPMENT

**Pressure-Vacuum Control**: For control of two independent circuits and flexibility of switch arrangement, United Electric Controls Co. (Watertown, Mass.) has added Type H27A pressure-vacuum control to its control line. Settings are made on the unit's calibrated dial with a single-turn adjustment knob and pointer; switch adjustments are made by turning independent hex-head screws inside the enclosure. Once set, span between set-

**BEFORE YOU SWITCH TO A RED OIL SUBSTITUTE:**

# Make this simple test




## LIGHT BULB TEST proves the superiority of Red Oil!

Some red oil substitutes contain a higher percentage of polyunsaturates than found in red oil. In the presence of heat these materials tend to solidify . . . to form a gum residue. This characteristic may be desirable *if* you want a *drying oil*. But, if you have purchased a red oil substitute for reasons of economy, for an application where oxidation or polymerization is an undesirable factor, your economy may well be a compromise with the quality of your product.

A simple test, as shown above and explained at right, will show, by sight, whether or not the product you are now using leaves a gum deposit in the presence of heat. Place *any* red oil substitute in beaker "B" *but reserve the other* . . . for SWIFT'S Red Oil. Write for a trial order today and remember . . .

ONE TRIAL IS BETTER
THAN A THOUSAND CLAIMS

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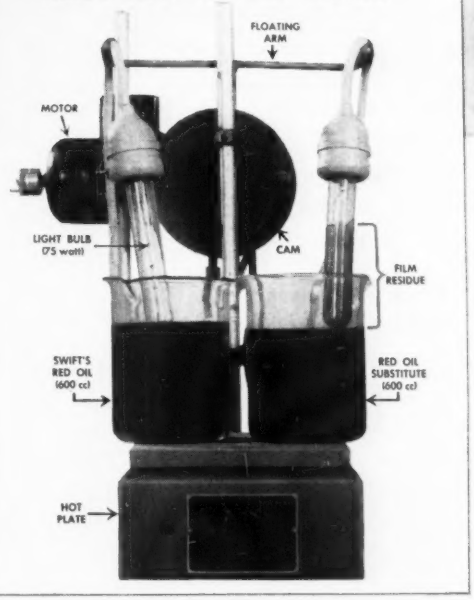
**HERE'S HOW THE TEST WORKS:**




*Apparatus is arranged* to subject lighted bulbs to continuous immersion and withdrawal from beakers over a period of several days. Hot plate should be set to maintain temperature of oil at about 250° F. Results of test will be visible. Oil which contains polyunsaturates will be revealed by build-up of film on the surface of the light bulb.

Swift
102ND YEAR

*To Serve Your Industry Better*

# "YOUR *Customers* ARE WAITING TO SEE YOU."

If your secretary ever greeted you like this, you'd probably give her a raise on the spot.

But your ad in the Chemical Week Buyer's Guide actually does bring your customers to you . . . many times, and always when they're on the point of making a buying decision.

Multiple advertiser benefits include your name printed boldface wherever it appears . . . Product Index, Company Index, Trade Name Index . . . to give it added impact; and if you are a catalog advertiser your listing will be displayed in a larger type size with a cross reference to the location of your catalog insert.

Now—a new high in circulation to over 32,000 CPI buyers guarantees heavier reader traffic then ever before. Make the most of this year-long selling tool with fractional-page ads next to your product listing and a catalog insert to sew up future sales.

Reserve your space in the new 1957 BUYER'S GUIDE today.

**CHEMICAL WEEK**
**BUYER'S GUIDE**

Published September 14
Closing ROB July 1
Catalog Inserts August 1




tings is maintained throughout range. Eight models offer adjustment ranges between 0 and 180 psi.

•

**Voltage Regulator**: Its new Type TM7105 Stabiline automatic voltage regulator provides maintenance-free operation in critical manufacturing processes, says The Superior Electric Co. (Bristol, Conn.). The magnetic unit has no tubes, transistors or moving parts in the assembly, is designed to supply constant voltage despite changes in line voltage or load. Input: 95-135 volts; output: 115 volts nominal; load: 5 kva.

•

**Crucible Coating**: A beryllium oxide crucible wash for coating graphite crucibles used in melting uranium-base alloys for nuclear applications is a new product of The Beryllium Corp. (Reading, Pa.). The coating, at a thickness of 0.025-0.030 in., is recommended for melting temperatures above 1600 C except where the zirconium content of uranium-zirconium alloys is more than 4%.

•

**Insulation Tapes:** Two new electrical insulation tapes of nonwoven Dacron fabric reinforced with Dacron filament yarns have been introduced by Minnesota Mining & Mfg. Co. (St. Paul). The firm says the tapes have about 50% more tensile strength than previous Scotch Brand Polyester Web, with strength retention up to 430 F, moisture absorption of 0.5%. They are available in widths up to 44 in., lengths up to 720 yards.

•

**Humidity Indicator:** Available from Serdex, Inc. (Boston) is a new indicator for measuring humidity at remote points. Vacuum line draws air sample to be measured into indicator chamber. Temperature-compensating coil in the

WIDE WORLD

## Pressure-Suited Preparedness

**Well-suited** to cope with radiation hazards, safety foreman W. L. Jones demonstrates the technique that would be employed in checking contamination of equipment by radioactive fallout. It's all part of a program to prepare for an unlikely "incident" at Britain's experimental fast-breeder reactor at Dounreay, Scotland. Scheduled for completion this year, the breeder reactor (sphere in background) is Britain's second atomic power plant. But unlike Calder Hall, the Dounreay reactor is strictly experimental, is not designed to produce commercial electrical power.

# Another Graver Contribution to American Industry 1857-1957

IN 1884...73 YEARS AGO...

## They Scoffed at Wm. Graver's Determination to Build Storage Tanks with Light Plate

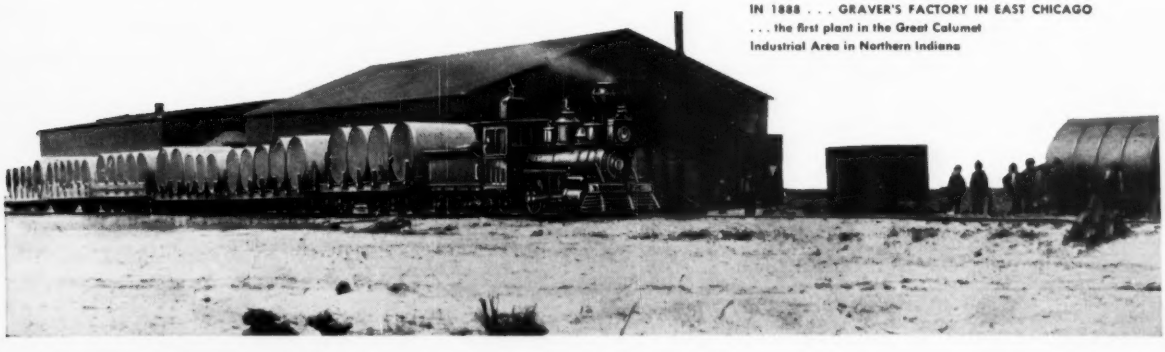
*Quoted from an article "Graver Tanks Are Monuments to Confidence, Energy and Skill," The Southwestern Oil Journal, December 5, 1919:*

"• • • It had been the theory of Chicago tank builders that tanks should be constructed like boilers—made of heavy material and capable of standing a great pressure. Mr. Graver could erect his tanks much cheaper than those being put up by the Chicago concerns, but he was unable to get his just share of the business. He took contracts for other kind of work and his perseverance was finally rewarded by a contract to build four linseed tanks of considerable size for a Chicago concern. Failure was predicted by his competitors and Joseph T. Ryerson, from whom he was purchasing the material, also became skeptical of the outcome.

Having called Mr. Graver into conference and being assured that he had successfully constructed the lighter tanks for the Standard Oil Company, Mr. Ryerson gave the oil company his word that the tanks would fill all requirements and Mr. Graver was allowed to go on with the contract. William Graver, his son, J. P. Graver, now president of the company and Mike Sheets, the construction foreman, got the material out for the tank at their plant in Clark street.

The tank trade was especially interested in the construction of the tanks and they gathered daily to watch the erection. Gloomy predictions were voiced from the laying of the bottoms to the completion of the tanks. However, William Graver had his day when the first tank was tested out. A large crowd was on hand to see the tank filled up, and as the gauge on the tank soared and it still held, many of his competitors turned on their heels, wiser apparently in tank construction.

It was upon the completion of this tank that William Graver began to reap the fruit of his labor. Orders came pouring in and from that day to this the Gravers have been favored with a large share of the tank business."



IN 1888 . . . GRAVER'S FACTORY IN EAST CHICAGO . . . the first plant in the Great Calumet Industrial Area in Northern Indiana

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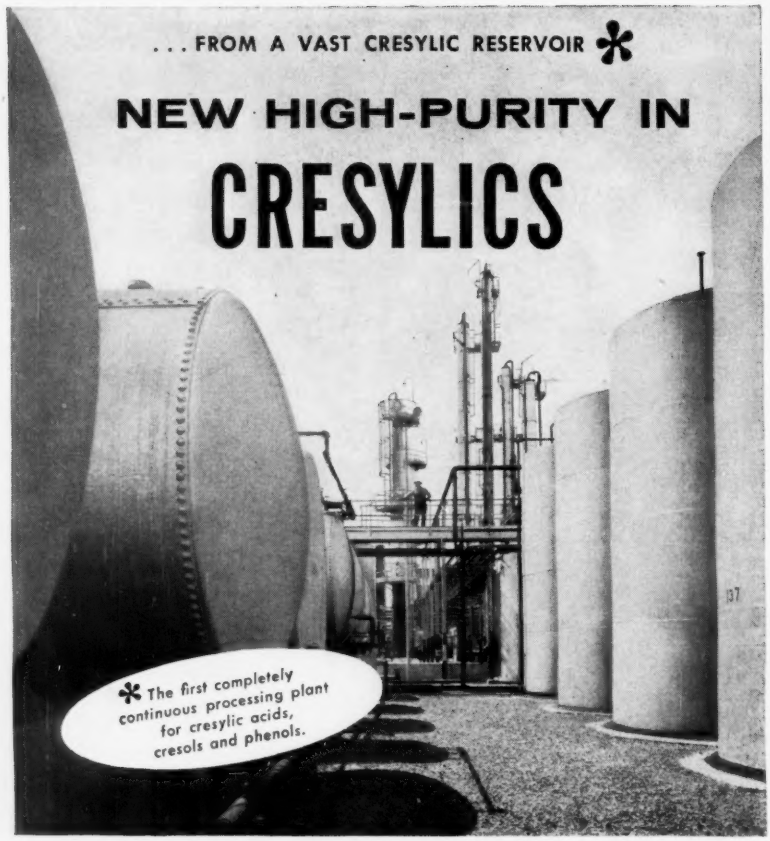
GRAVER TANK & MFG. CO., INC.

EAST CHICAGO, INDIANA • NEW YORK • PHILADELPHIA • EDGE MOOR, DELAWARE
PITTSBURGH • DETROIT • CHICAGO • TULSA • SAND SPRINGS, OKLAHOMA
HOUSTON • LOS ANGELES • FONTANA, CALIFORNIA • SAN FRANCISCO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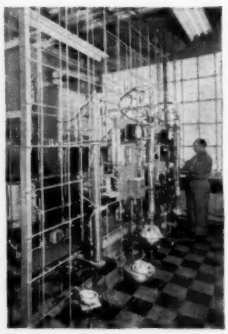
NEW HIGH-PURITY IN
CRESYLICS
✻ The first completely continuous processing plant for cresylic acids, cresols and phenols.

From PITT-CONSOL's vast refining plant come phenols, cresols, xylenols and cresylic acids of a purity unsurpassed by any other producer of refined acids. Derived from petroleum, they contain *no neutral oils, no tar bases . . . practically no sulfur*. This high purity is helping to solve problems of color, odor, and chemical reaction control in many plants where high grade phenolic resins, esters, pharmaceuticals, detergents, disinfectants, solvents and other end products are produced.



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A SUBSIDIARY OF PITTSBURGH CONSOLIDATION COAL CO.




instrument keeps chamber temperature at same level as at the area sampled.

•

**Sanitary Pump**: Waukesha Foundry Co. (Waukesha, Wis.) has announced the availability of a new side-mounted sanitary pump for heavy, viscous products. Pump base is designed for mounting pump so that intake and outlet are vertical—intake can be attached directly to bottom outlet of tanks, eliminating piping elbows that might restrict flow. Capacities: 60-100 gpm.

•

**Resistance Thermometers:** Trans-Sonics, Inc. (Burlington, Mass.) is out with a new line of high-speed platinum resistance thermometers for sensing elements in noncorrosive liquids and gases. Thermal response is less than 2.5 seconds in air, less than 50 milliseconds in water. Temperature range: -320 F to 750 F with an accuracy of 1% of full scale and repeatability of 0.2%. The pickups will deliver up to 5 volts directly to telemetry circuits without amplification.

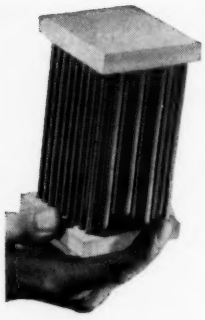
•

**Automation**: Several new automation components and a new converter have recently been made available:

• Fischer & Porter Co. (Hatboro, Pa.) has added three new code outputs for Digi-Coder, its shaft-position analog-to-digital converter. The new codes permit Digi-Coder to convert angular position into digital output in the form of (1) degrees and tenths of a degree, (2) any part of a 24-hour time cycle in hours and minutes, (3) an 8-channel Teletype or Flexowriter code.

• Librascope, Inc. (Glendale, Calif.) offers its model 25 Linear Integrator, a ball and disc mechanism with a counter and output pulse switch, to provide continuous integration in any system requiring integration, area or average computations, and direct or remote reading. Adapter kits are available for most strip-chart recorders.

• Packard-Bell Computer Corp. (Los Angeles) is out with a completely transistorized analog-to-digital and digital-to-analog converter. Tagged Multiverter, its speeds are: over 15,000/second for analog-to-digital conversion, 300,000/second for digital-to-analog conversion with accuracies of better than 0.01%. The converter permits multiplication and division during conversion, says P-B.



# An important message

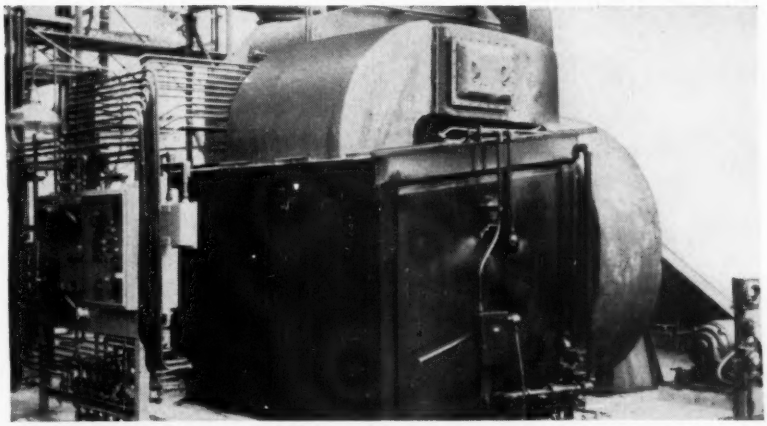
# to the man who thinks his air pollution problem is too difficult—or too expensive—to correct

Too often an air pollution problem exists today for one reason only: The company concerned does not yet know there is now at hand an efficient, effective method of correcting it—often at an actual saving through waste heat recovery.

The method is catalytic oxidation, and the firm that makes this development possible is Oxy-Catalyst, Inc.

Catalytic oxidation works by "burning" harmful and irritating combustible contaminants in an exhaust stream at temperatures far below their normal ignition points. It provides close to 100% cleanup of foul-smelling fumes and odors. It reduces fire hazards and maintenance problems by eliminating troublesome condensates in oven and furnace exhausts.

Thus Oxy-Catalyst installations can not only control air pollution. They can also be used to release the latent heat energy in waste and process gases. And they can sometimes do both at once.



**Oxycat installation** on Standard Oil Company of California's phthalic anhydride unit at Richmond, Calif.

### A More Efficient Catalyst

The key to successful catalytic oxidation is, of course, the catalyst itself. Features which make the Oxycat unique are:

- *The combination of platinum and alumina, chosen from hundreds of elements and compounds as the most active and long lasting catalytic agent*
- *The carrier, a high-grade porcelain selected for its strength, chemical inertness, and resistance to high temperatures*
- *The patented method of applying the catalyst to the carrier*
- *The patented mechanical design of the Oxycat itself*

The result of this combination of features is a catalytic unit with exceptionally long life at high efficiency. Oxycats are strongly resistant to thermal shock—to contaminating agents and clogging. There's no problem of frequent cleaning or reprocessing. Oxy-Catalyst installations are still functioning at high initial efficiency after over 20,000 hours without maintenance or servicing.

### Already in Wide Use

Oxy-Catalyst installations are now working effectively in a wide range of industries—oxidizing combustibles from such processes as asphalt oxidation; phthalic anhydride, polyethylene and ethylene oxide manufacturing; catalytic cracking; and many others.

Oxy-Catalyst installations are carefully engineered to your individual requirements, and our engineers, working with yours, can install Oxycats effectively in any existing plant. So, if air pollution is a problem in your operation—if irritating fumes and odors are costing you neighborhood good will—you should know that Oxy-Catalyst offers a practical, realistic answer to your problem.

Fill in the coupon, or write on your business letterhead, for complete information now.

## OXY-CATALYST, INC.

**Industrial Division**

**Wayne, Pa., U.S.A.**

Fume Elimination Processes and Equipment
Industrial • Automotive • Consumer Products

**Oxy-Catalyst, Inc.**
**Industrial Division, Wayne 6, Pa.**

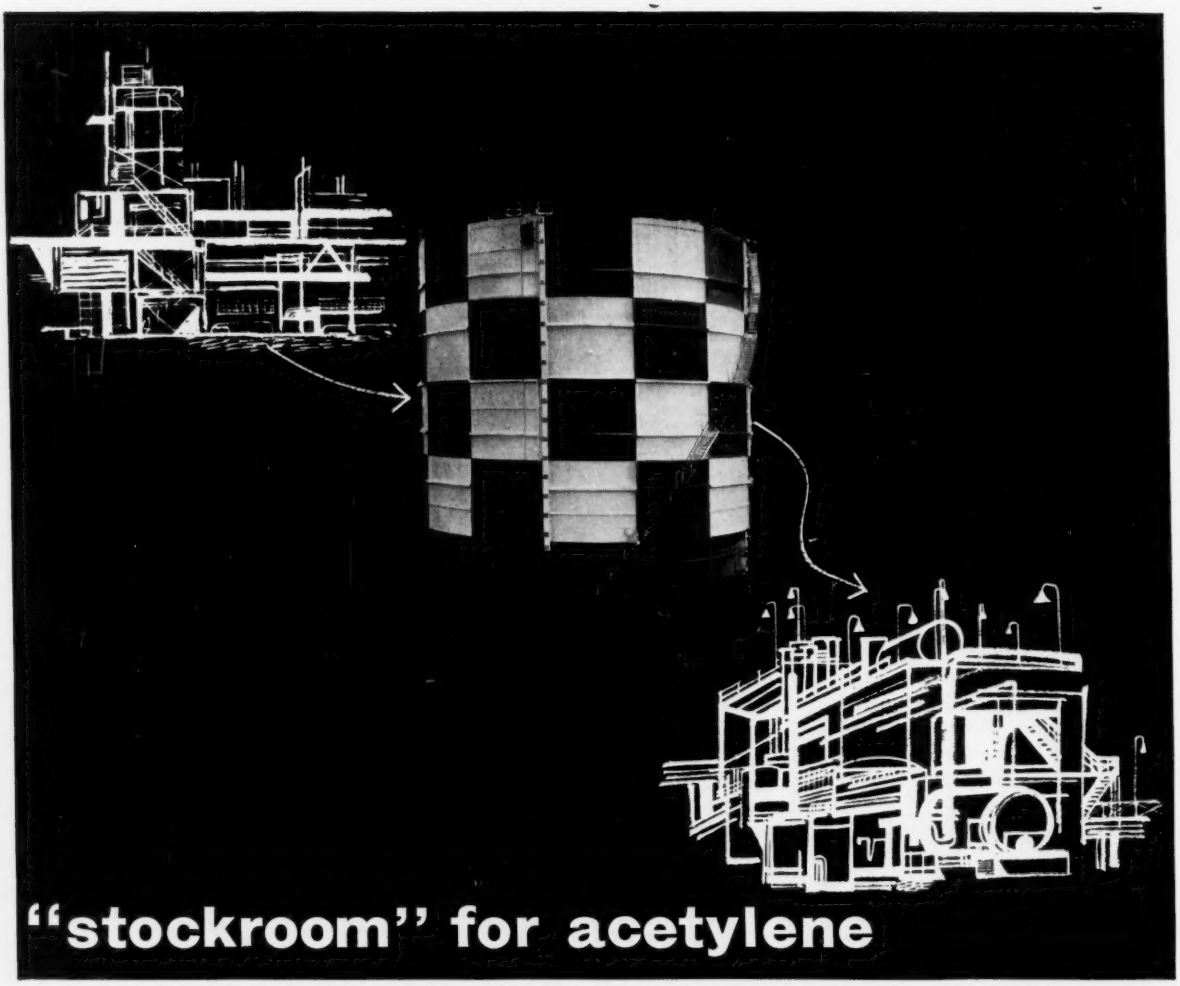
Please send me complete information on your catalytic oxidation process for air pollution control and waste heat recovery.

**Name**_____

**Firm name**_____

**Street**_____

**City**_____ **Zone No.**_____ **State**_____




## Linde purchases Wiggins Gasholder for storage of acetylene between production and use cycles

When Linde Air Products Company's new acetylene plant in Montague, Michigan goes "on stream", a new 100,000-cubic-foot Wiggins Gasholder will play a vital role in the operation. Every cubic foot of acetylene produced will pass through the "stockroom" on its way to DuPont for use in the production of Neoprene. The gasholder will provide acetylene storage and will serve as surge capacity to enable Linde to satisfy both normal and emergency requirements.

If you produce, store or use gases, investigate the advantages of Wiggins Gasholders. They can be built to any capacity—from 50-cubic-feet to a million. Call or write General American for complete information.

WIGGINS VAPOR SEALS GENERAL AMERICAN TRADE MARK

**GENERAL AMERICAN TRANSPORTATION CORPORATION**

*135 South La Salle Street, Chicago 90, Illinois.*

*Offices in Principal Cities*

**SEARCHING APPRAISAL: Carbide's Fogle and Lilly's Varnes weigh purchasers' shortcomings.**

**TWO COUNTS: Secrecy and excessive demands, say Cyanamid's Clow, Monsanto's Tupper, are typical**

# Purchasers Counter an Indictment

FOUR top sales executives, some 170 chemical purchasing agents* and one magazine editor crowded themselves into a corner room of Atlantic City's immense Convention Hall last fortnight, searchingly appraised the four most troublesome conditions that salesmen now encounter in purchasing departments.

The conditions—inadequate technical knowledge, buyers without authority, poor handling of salesmen, and excessive demands for service—came to light in two *CW* surveys (*Feb. 26, p. 90; March 9, p. 126*), formed the "indictment" put by panel moderator *CW* Editor Howard Johnson to panel discussion members: Union Carbide Chemical's vice-president, E. Fogle; Eli Lilly's executive director of agricultural and industrial products, G. L. Varnes; general manager of American Cyanamid's Farm and Home Division, A. B. Clow; and Monsanto's Organic Chemicals Division sales director, T. C. Tupper.

The findings:

• **Inadequate technical knowledge:** This problem, holds Carbide's Fogle, is now confined only to a minor-

*The meeting was part of the annual convention of the National Assn. of Purchasing Agents.

ity of buyers but has great potential for spreading. That's because the chemical industry and its products are becoming steadily more complex. In 1957, the chemical industry will spend more than $500 million for research and development, a 450% boost over 1950's.

• **Lack of buying authority:** Purchasing departments without sufficient power to make decisions are more common than generally supposed, Lilly's Varnes told the meeting. The situation, he said, often stems from failure of top management to define the responsibilities of the person involved, reluctance of other departments to relinquish authority, and existence of below-average purchasing management. "Top management should see that purchasing has proper rank . . . and this rank should be at the management level . . . have a place in all planning and over-all company operation. Management should turn over to purchasing men full authority for procurement."

• **Salesmen handling:** Complaints by salesmen of mistreatment by chemical buyers are probably much more a rationalization of salesmen's shortcomings than valid charges, Clow said.

"Oversecretiveness" is probably the most serious of all salesmen's gripes. Said Clow: "If a chemical salesman's been doing a thorough job for you, I think you should go as far in return as you can. You are building a relationship that you can always depend upon." If a confidence is broken, however, action should be directed only against the individual.

• **Excessive service demands:** Is it fair, queried Monsanto's Tupper, to ask a supplier furnishing 2 or 3% of the company's formula, to make test evaluations on 12 proposed new formulations? Another trouble area, Tupper finds, is rush shipments. While most suppliers try hard to help in a real emergency, many have noted that such requests repeatedly come from the same source. Responding to such entreaties often jeopardizes the supplier's relationship with his own production staff and transit services.

A third major problem for suppliers, Tupper noted, is the tendency of some purchasing agents to place orders just before a previously announced price increase takes effect. Taking in a year's supply under such circumstances, avers Tupper, "is not ethical."

## COMMODITY TRENDS

**Here's what chemical buyers at the Atlantic City convention of the National Assn. of Purchasing Agents heard about:**

### NONFERROUS METALS—

**Aluminum, copper and zinc markets will tighten markedly by September.**

*—Thomas C. Campbell, Editor-in-Chief, The Iron Age*

**Lead consumption in storage batteries will tail off; the trend in high-octane fuels will be away from use of tetraethyl lead.**

*—George Brady, Materials Consultant for NAPA*

### STEEL—

**1957 consumption will set a record, despite a general production decline.**

*—Richard Sentner, executive vice-president, U. S. Steel Corp.*

### OIL—

**Inventories of fuel oils will increase considerably, and prices will tumble, stay depressed, if imports are unrestricted.**

*—Leon Hess, vice-president, Hess, Inc.*

### COAL—

**Growth of steel and electric power industries and export demand will prevent depressed markets for coal from occurring.**

*—J. W. Kepler, vice-president, Pittsburgh Consolidation Coal Co.*

# Ahead: Price, Supply Shifts

**Price and supply** trends for nonferrous metals, steel, coal and oil—all essential to chemical industry—are changing directions. Copper and zinc price tags, for example, now sagging under reduced demand, are expected to turn about and head higher. And the upward surge of oil prices appears to be reversing, with further price reductions imminent.

That's the forecast—by top market authorities—that startled business-wise buyers thronging the latest annual meeting of the National Assn. of Purchasing Agents held at Atlantic City (*see p. 107*). Here are the predictions, the reasoning behind them.

**Nonferrous Metals:** Buying of aluminum, copper and zinc, though currently slow, will increase greatly before year's end. The estimate (by *Iron Age's* editor-in-chief, Thomas Campbell) stems from expected labor trouble in the auto industry in 1958. Car producers will push output of '58 models this fall to build up strike-proof inventories. Appliances, hefty consumers of copper and other nonferrous metals, should get greater consumer interest because of rising take-home pay. High production costs and dependence on imports will also stim-

# Using Salt Efficiently

by **INTERNATIONAL SALT COMPANY, INC.**—America's largest producer of salt

## Salt Dissolvers, Brine Storage Units Now Available in Corrosion-Proof Plastic

**Here's important news for every user of salt brine.** In response to a growing demand for equipment that will not rust or corrode in use, International is now offering fully automatic plastic dissolvers for both rock and evaporated salt—as well as plastic storage tanks for brine. Already in use in many plants, these plastic units give the same fine performance as International's metal equipment, with this important added feature: they are 100% corrosion-proof.

To select the correct plastic for these new units, International's researchers conducted an exhaustive series of tests. These tests showed that a fiber-glass-reinforced polyester is most suitable for the job. Made of this material, the new plastic units will stand up, with strength to spare, when loaded to full capacity.

The reinforced plastic used in this new equipment is completely unaffected by any chemical action of salt or brine. Because of this feature, there can never be any rust specks in the brine, and there is no danger of contaminating the brine's flavor or color.

**Durable, long-wearing . . .** In addition to being corrosion-proof, the plastic in International's new equipment has another important advantage. It is

unusually strong and durable—has one of the highest weight-strength ratios known today. In fact, during one testing procedure, a plastic brine storage unit was loaded with over 3,500 lbs. of coarse rock salt—and showed no deformation anywhere. Furthermore, this plastic will not dent or chip even under the severest conditions. As a result, years of trouble-free service are expected from these new units.

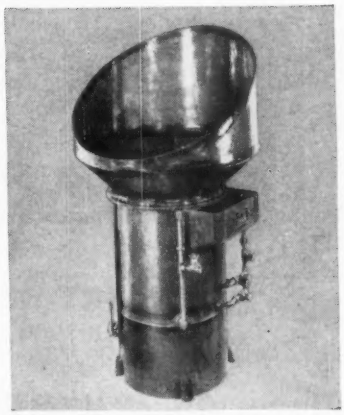
Sturdy construction is used throughout the dissolvers and storage tanks. For example, the points at which pipes or couplings enter the units are even stronger than the units themselves. Here, a new resin cement has been used to provide a tough, lasting bond between connections and tank walls.

**Other features . . .** The dissolvers and storage tanks—being made of plastic—need no painting or other maintenance. The units are especially light in weight, making installation or moving a simple job. And because they are translucent, the true brine or salt level is always visible.

**Two types of salt dissolver available . . .** For making high-quality brine from rock salt, the Sterling Model Lixator is available in plastic. This unit is a duplicate of International Salt Company's famous metal Lixator—and operates on exactly the same principle. Crystal-clear, fully saturated brine for all plant uses is made automatically by the Lixator—and can be delivered automatically to all points of use from the Lixator.

Also available in plastic is the Sterling Evaporated Salt Dissolver for making brine from different types of evaporated salt. Both these plastic dissolvers offer the same savings in labor, space, and salt as the same models made of metal.

**LOOKING DOWN** into the new plastic dissolver. Shows simple, rugged construction . . . float for liquid level control . . . circular pipe for admitting water into dissolving chamber.



**STERLING MODEL LIXATOR IN PLASTIC.** Widely used today for making Lixate Brine for water softening, canning, meat packing, chemical manufacture, etc.

The new plastic dissolvers are available in the same standard sizes as International's metal units. And the brine storage tanks in plastic can be made in sizes to meet a plant's specific requirements.

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If you'd like the assistance of an International "Salt Specialist" on any problem concerning salt or brine—or further information on the new plastic equipment—just contact your nearest International Salt Company sales office.

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ulate upward price movement for copper.

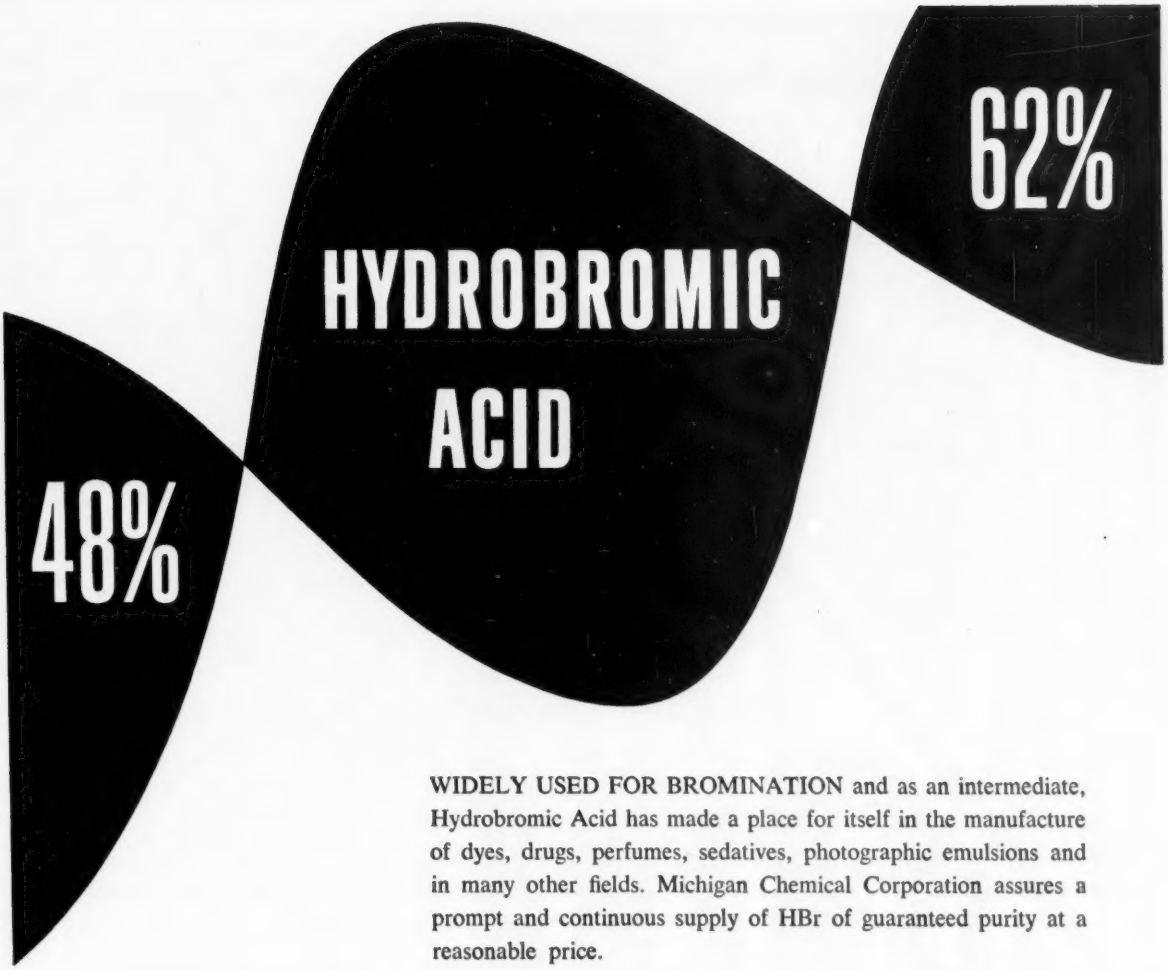
Despite the current softening in zinc prices, pressure for increases is developing in some areas. An anticipated 5-8% rise in farm income will aid galvanized farm supply sales. And, seconding that forecast, NAPA materials consultant, George Brady, predicted zinc markets will respond to the road-building boom, high demand for galvanized highway culverts.

For other metals, Brady forecast:

- Die castings, extruded cans, electrical wire and apparatus and pipe will spark sharp acceleration in aluminum consumption.
- Lead use in storage batteries and high-octane fuels will decline, and the government will curtail stockpile purchasing.
- Commercial use of titanium won't "take a spectacular rise in the near future." High metal fabricating costs will restrict demand until cheaper methods are devised.
- Increased nickel production and the cessation of federal stockpile buying will not make nickel freely available. Big requirements of the chemical, atomic and electrical industries will necessitate careful allocations. Nor will the proposed "free market" for nickel increase its availability. Nonessential uses, Brady held, then would compete for supplies, keep nickel short.

**Steel:** From U.S. Steel vice-president, Richard F. Sentner, came the caution that steel markets would remain firm. Although ingot production has tapered off, steel consumption will reach record levels this year. Moderate liquidation of inventories will occur during the second half of '57. Any slack in steel consumption caused by declining automotive use will be largely offset by heavy ordering from freight-car fabricators and shipbuilders. Looking ahead, Sentner estimated that steel capacity would grow 10 million tons by '58, some 50 million tons by '75.

**Coal:** The comeback of bituminous fuel, forecasts Pittsburgh Consolidation Coal vice-president J. W. Kepler, will continue. In the new fuel pattern, expanded export sales and "steady growth of steel and electric power use" will offset any decline in heating use. The industry will embark upon a cautious expansion program, add 30 million tons of replacement and

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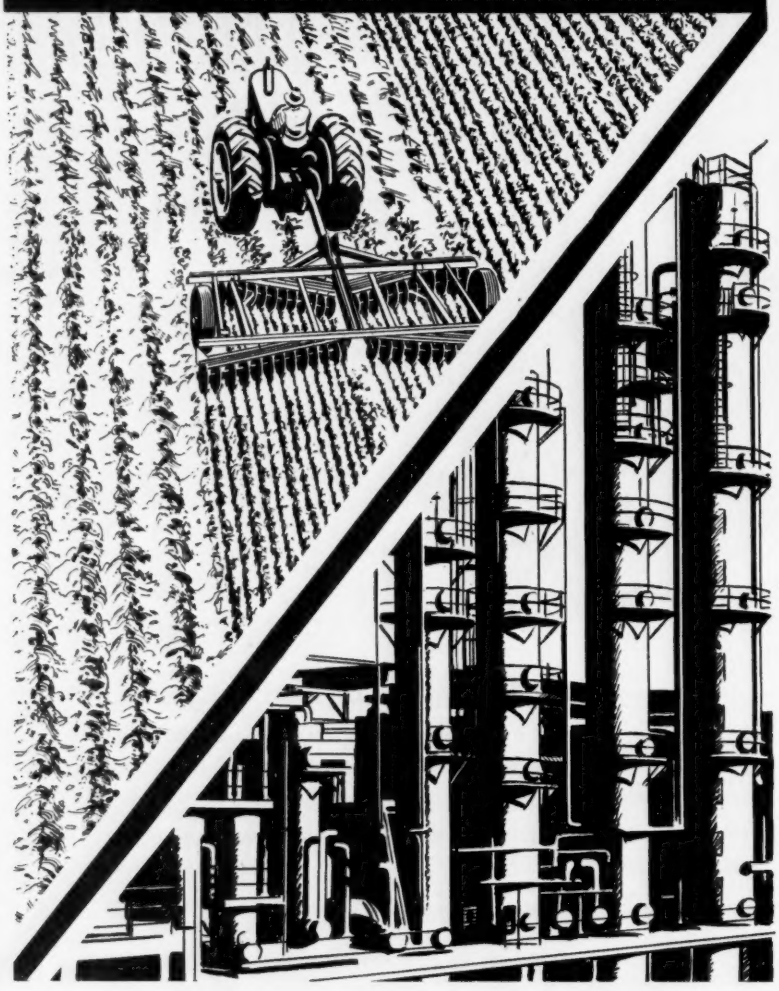

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## SALES

additional mine capacity this year. Further mine expansion may be stimulated, holds Kepler, by the recent price hike.

**Oil:** For the task of spotlighting coming developments in oil, NAPA called upon Leon Hess, vice-president of Hess, Inc.* Hess made four main points:

1—Fuel oil inventories, now higher than before Suez, will keep climbing during the summer.

2—Prices are now artificially high. When European deliveries end soon, fuel oil prices will drop sharply. Recent cuts in prices of residual and heating oils will be followed by further reductions.

3—Prices will stay down if imports are not curtailed.

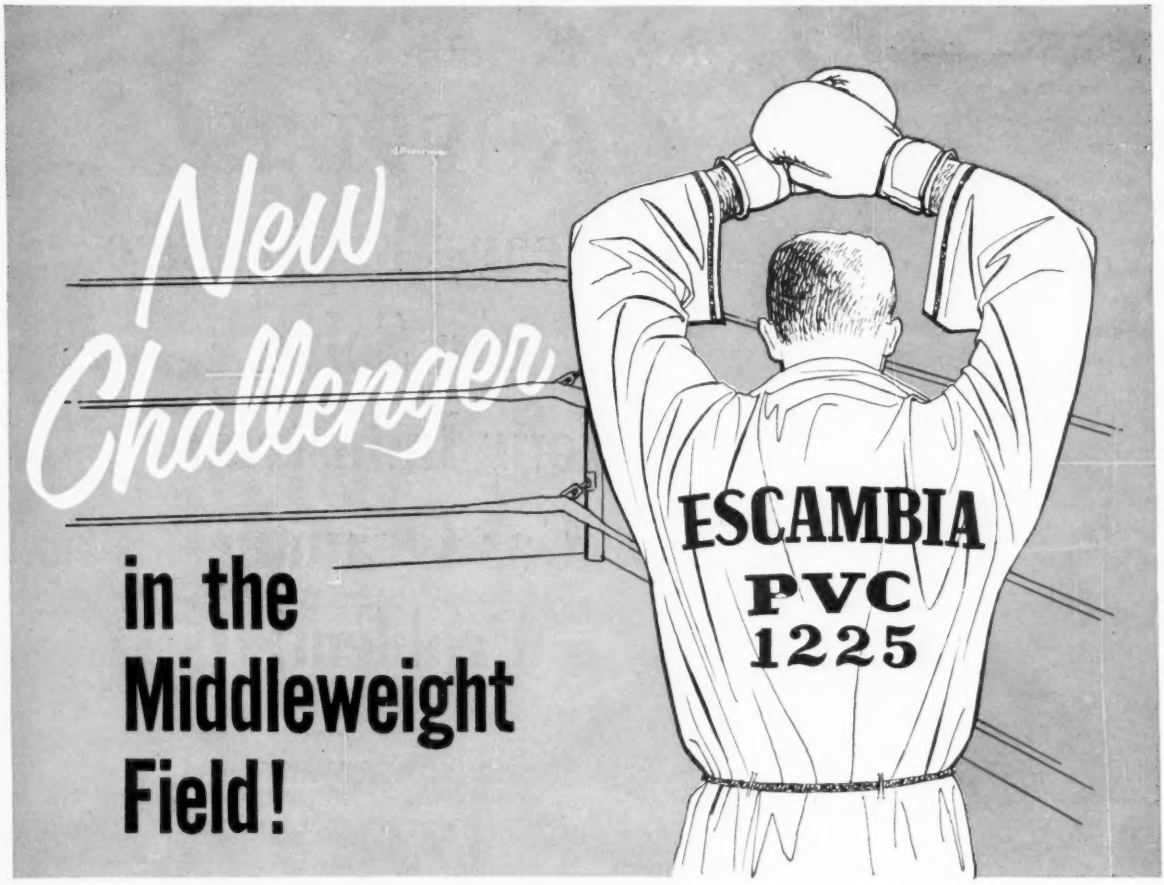
4—New reserves will be found in U.S. offshore lands, Canada, Venezuela and the Middle East. Hence, a surplus oil supply is likely. If small oil producers and independents find foreign sources, Hess expects the drive for import restrictions to slacken.

Evidence of the accuracy of short-term "guesstimates" won't be long in coming in. Should the predictions come true, chemical process firms will find oil costs slipping and metal costs climbing.

## DATA DIGEST

- **Dimethyl sulfide:** 4-p. folder highlights chemical reactions, gives specifications, solubilities, handling suggestions and literature references. Chemical Division, Crown Zellerbach Corp. (Camas, Wash.).
- **Glutaraldehyde:** Applications as an insolubilizing agent for cork, flammable ingredients and water-repellent materials and bactericidal uses are suggested in new 4-p. bulletin. Technical data, major chemical reactions also included. Union Carbide Chemicals Co. (New York).
- **Antioxidant:** Technical bulletin outlines chemical and physical properties of 2,6-di-tert-butyl-4-methyl phenol as an antioxidant. Davison Chemical Co. (Baltimore).
- **Polyvinyl acetate adhesive:** Data sheet describes compatibility of resin emulsion E-2131 with dextrine adhesives and application of end-product with various types of packaging machinery. Paisley Products, Inc. (Chicago).

*Major business interest: oil distribution.

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How Koppers got that knowledge and experience is a story in itself. By building gas handling equipment for over seventy-five years. By handling coke gases in Koppers own plants for over forty-five years. By successfully solving gas cleaning problems in every industry where they are a headache . . . in plants of all sizes, with a wide variety of individual problems. So . . . when a Koppers engineer studies your specific problem, you know he has this wealth of experience to draw upon. It helps make him the best gas cleaning engineer in the business.

To drive your costs down even further in the solution of gas cleaning problems, Koppers carries on a never-ending research program . . . creating new gas cleaning techniques . . . finding out more and more about the properties and composition of materials that pollute the air. That's the job of Koppers' multi-million dollar research center at Verona, Pa.

Constant development of improved equipment and advanced design is the job of Koppers' Mechanical Development Laboratory at Baltimore. Backing up all this research is a sixty-year study by Koppers of current American and European gas cleaning techniques.

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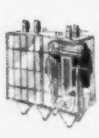
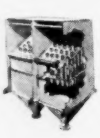


***Koppers Electrostatic Precipitator.*** Koppers custom-designs Electrostatic Precipitators that eliminate "stack nuisance" . . . remove fly ash, acid mist, soot . . . recover high-value material.



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***Koppers Aeroturn Dust Collectors.*** Automatic pressure control and reverse-air-jet action provide high, continuous filtering. Clean air, reclaimed materials. Felt-type filters are more efficient; last longer.

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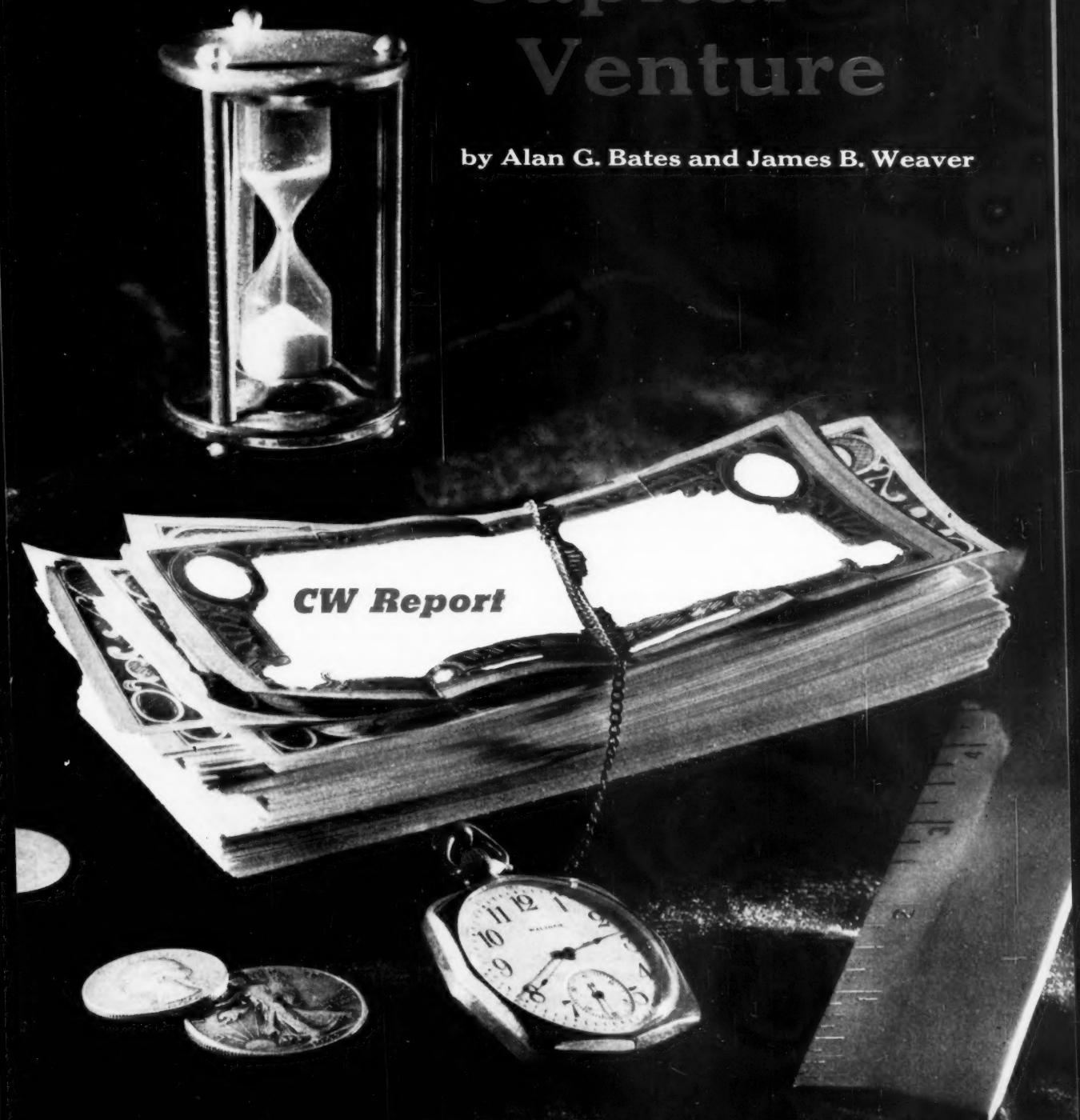
# Capital Venture

by Alan G. Bates and James B. Weaver




***methods to help you select it wisely***

# CW Report

**New products and processes vie for capital with potential plant expansions, pending mergers and other investments. Here's how to determine which proposal gets the go-ahead.**

WITH limited capital resources at its command, the managements of many companies are swamped by more investment opportunities than they can finance.

Because capital funds can be spread just so thin, top management faces the critical task of singling out from all possible alternatives those investments with the greatest potential earning power.

Management has a choice of methods to aid in the selection of projects that offer the best profit potential. All of these methods, in effect, try to reduce a frequently complicated proposal to a simple expression of its estimated long-term prospects.

This report treats in detail six of these "profitability yardsticks": return on original investment, return on average investment, payout time, payout time (including interest), present worth, and interest rate of return. All six contain inherent advantages and disadvantages that should be recognized before one of them is finally chosen, used to trigger all subsequent company investment decisions.

Return on original investment, return on average investment, payout time were developed before much was known about the methods of cost estimating or sales forecasting.

Today, newer tools for judging profitability are available. How do they differ frow the earlier and generally simpler methods? What are their comparative strong points, their shortcomings? Which one of the six seems best to use as a basis for decisions? The purpose of this report is to help management find answers to these key questions.

## Some Basics First

**A chemical company's** growth and performance is established by a series of investment decisions its management make over the years. If a proper measure is developed for each individual investment decision, the same measure can be applied to the over-all company profit-investment picture.

Consider briefly some common measures (i.e., sales growth or growth expressed in terms of a profit-to-sales ratio) of company performance. Are they adequate measures of investment performance?

No one would invest in a plant merely to increase sales unless profits were also increased. Neither would they invest huge sums in order to produce at a high profit- to-sales ratio if total profits were small.

Thus, it is profit, not sales, that measures the success of the venture. Since the investment decision is the key point, all adequate measures of investment directly relate profit to the size of the investment itself. Sales growth, therefore, or increase in profit-to-sales ratio, are not enough to judge individual capital investments. Some measure of profit as a return on investment is obviously needed.

Acting for the stockholders, company management invests money for increased profits—not to swell sales or merely to increase the profit-to-sales ratio.

**Bird in Hand:** Profit and investment, as the keystones of all investment decisions, are the two main items, then, that must be properly related by a useful measure.

In connection with profits, another concept must be recognized, too—the "time value" of money. It may seem obvious to say that dollars in hand today are worth more than the promise of dollars at some later time—even tomorrow. By the same token, projects that return money fastest (other factors being equal) are the most desirable ones. Early return of profits paves the way for faster reinvestment at a higher profit return.

Some profitability methods in use today inadequately account for this time-value concept. Others specifically provide for this advantage of obtaining a "quick buck." These, in fact, penalize incomes the longer they take to materialize.

**Data Absorption Counts:** A truly comprehensive yardstick should have an insatiable hunger for information. It should absorb as much data, in as fine detail, as the estimator sees fit to feed it. This data will include the amount of investment and the period of time over which it is made; the amount and timing of profits; and the timing and amount of capital recoveries, such as depreciation, salvage value, working capital, land, etc. The profitability answer obtained should be properly sensitive to each of these items.

It might seem a disadvantage for a method to require year-by-year forecasts of costs, sales and prices, forecasts that determine the timing of profits. On the contrary, such detailed analyses can be of real help in highlighting the gradual changes in prices, for example, that might not otherwise be considered at all.

**An Absolute Measure:** Efficient devices for measuring length tell not only whether one line is longer than another but also how long each line is. Similarly, the ideal investment yardstick should be able to compare alternate investments, and, at the same time, show the absolute magnitude of each proposal.

None of the yardsticks described here seems to meet all of these requirements completely. However, taking all above considerations as ideal, each method will be compared with the others in terms of its fulfillment of these ideal requirements.

Assume for a moment that a truly comprehensive measure of profitability exists (it doesn't). Sources of capital, capital availability, cost of money from various sources—all these factors must also be investigated before final figuring begins. Many project intangibles, e.g., obsolescence, safety and presence or absence of competition, must also be studied carefully before capital investments are finally okayed.

Admittedly, all these factors are important in measuring return on investments, but they are outside the scope of this report. Attention here is focused on the profitability methods themselves.

**Assumptions Needed:** Certain assumptions must be clarified before discussing the methods themselves.

**Working Capital:** In investment calculations, working capital is interpreted as the net funds required to pay salaries and trade bills, to maintain inventories, to finance sale of goods until payment is obtained (receivables)—less those funds supplied by trade creditors and others with claims on the company's or project's funds (accrued taxes and wages payable, for example).

Although these funds are continuously being liquidated and regenerated, working capital itself is a real investment. Reason: it is unavailable for any other purpose whatsoever, so long as the project exists. Working capital is part of almost any investment proposal. Some authorities, on the other hand, hold that it is equally correct to exclude working capital from profitability calculations.

If there is a real need for working capital, it may be a more permanent sort of investment than fixed investment. Through depreciation, fixed investment is recovered throughout the project life; working capital is not reclaimed, even in part, until permanent plant shutdown.

**Taxes:** In this report, profits are defined as profits after taxes. Opinions differ as to whether or not tax effects should be included in an investment study.

No issue would be involved if competing projects always showed the same relative profitability, regardless of taxes. Taxes, however, may have a distinct effect on the choice between proposals; they are as real an expense, in fact, as raw materials or labor. They can have unequal effects on different projects.

Since taxes influence profits but do not affect depreciation accruals, profitability must be included on an after-tax basis in order to consider the effect of these two cash generations in their proper proportion.

No better example of the impact of taxes on investment decisions need be offered than this: some foreign investments are being made today by chemical companies solely on the basis of the favorable tax structures involved.

**Freedom to Reject:** Not treated here are the so-called "replacement decision" techniques. They basically assume that replacement of a given piece of equipment or plant is necessary; they merely serve to indicate when a given investment should be made and in which of several competing machines or items of equipment.

In applying any of the investment yardsticks discussed here, we assume that a capital investment project has been proposed but must not necessarily be accepted.

**Competition Between Alternatives:** In most cases, when an investment project comes up for decision, competing proposals for capital investments are also waiting to be acted upon simulataneously.

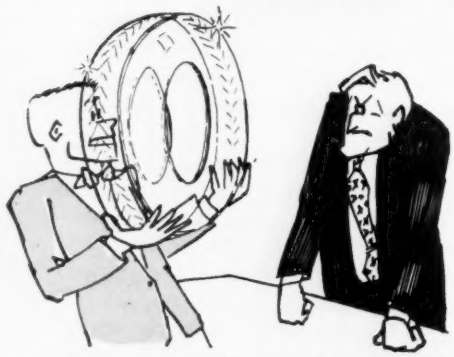
This competition might stem from several possible projects for manufacturing the same product by different processes. Or, competition between projects might spring from completely different venture schemes vying for the available supply of money.

It is assumed that any of the yardsticks described would be expected to determine the best of several competing alternatives.

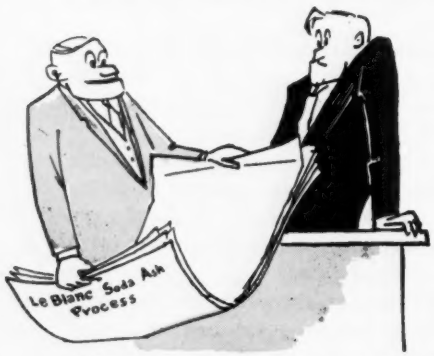
**Avoid these subjective pitfalls:**

1. 'This is my project and it's going through.'

2. 'But, we have always done it this way.'



3. 'If our competition can do it, so should we.'




4. 'This is the only possible way to do it.'

**These are the objective approaches:**

## Method 1: Return on Original Investment=

$$\frac{\text{Average yearly profit during earning life only}}{\text{Original fixed investment} + \text{working capital}}$$

## Method 2: Return on Average Investment=

$$\frac{\text{Average yearly profit during earning life only}}{\text{Average fixed investment} + \text{working capital}}$$

## Method 3: Payout Time=

$$\frac{\text{Original depreciable fixed investment}}{\text{Profit} + \text{yearly average depreciation over the period}}$$

## Method 4: Payout Time, Including Interest=

$$\frac{\text{Original depreciable fixed investment} + \text{interest*}}{\text{Profit} + \text{yearly average depreciation over the period}}$$

## Method 5: Present Worth=

$$\frac{\text{Present worth of project earnings}}{\text{Original fixed investment} + \text{working capital}}$$

**or**

**Present worth of project earnings — (original fixed investment + working capital)**

## Method 6: Interest Rate of Return=

$$\frac{\text{Average yearly profit during construction and earning life}}{\text{Average fixed investment} + \text{working capital} + \text{interest*}}$$

*Interest charged on both fixed and working capital to reflect time value of money.

## The Six Methods

**The three simplest** and most widely used ratios between profit and investment in the chemical process industries are: (1) return on original investment, (2) return on average investment, (3) payout time.

### 1—Return on Original Investment

**This profitability method** is sometimes called the "engineer's method" and is probably the most familiar of all six to chemical engineers.

It expresses profitability as a ratio of the expected average annual profit (only during the earning life of the project) to the total original investment in the project (*see table, p. 118*).

Average annual profit can be figured at various levels of expected capacity up to 100%. On the other hand, the calculation can be a result of a forecast of yearly sales volume, price and operating cost over the project's estimated service life.

In some instances, this ratio of average profits to total investment is adequate for comparing competing investments. Such cases might occur, for example, when the time pattern of money-flows in competing projects is assumed to be essentially the same for each project.

As a meaningful measure of a project's value to the company, however, this method generally leaves much to be desired. It does not account for the time value of money in any of the important cash-flow areas—investment, profit, depreciation or recovery of other investments. Its use of average profits prevents the method from fully utilizing information obtained from year-by-year forecasts.

On the positive side, the method is easy to calculate and to understand.

### 2—Return on Average Investment

**This method of figuring** profitability is also known as the "average book method" or "accounting method." It involves taking the ratio of average annual profit from the project (during the earning life only) to the average investment on the company's books over the same period (*see table, p. 118*). Average investment is calculated as the sum of the undepreciated value each year of the project life divided by the total number of years.

Using straight-line depreciation, average book value equals the initial plus the final value of the investment, divided by two. Working capital stays at full value, while fixed investment is depreciated.

Profits may be determined at various levels of capacity as in return on original investment; yearly forecasts of sales, costs, profits, etc., need not be made.

Calculating profitability by return on average investment has some advantages over the return-on-original-investment method. Depreciation is considered; dollar values of investment, profits and terminal recoveries are accounted for.

Although this method does not specifically provide for the time value of money, the advantages of accelerated depreciation recovery are reflected in a higher rate of return than for the same project when straight-line depreciation is employed.

The method does suffer, however, from an inability to account for the timing of profits. It also yields answers that are considerably higher than those obtained by the return-on-original-investment method or the interest-rate-of-return method (*see Method 6, p. 118*). For that reason, results may be deceiving when compared, say, against the company's cost of capital.

### 3—Payout Time

**"Payoff period,"** "payback period," "cash recovery period" are other names for this method of gauging profitability. As its name implies, the method expresses profitability as the number of years required to recover depreciable fixed investment from depreciation accruals and profits (*see table, p. 118*).

Investments other than depreciable fixed investments —land or working capital, for example—need not be included because these are considered recoverable at any time. This can be counted as a defect, since only fixed investment is considered.

Year-by-year forecasts of prices, costs and profits during the years up to the payout time may be fully utilized in estimating payout time.

In the early years of a project, therefore, the timing of profits and depreciation are properly reflected in the answer obtained by this method. High profits in the early years and accelerated depreciation give shorter payout-time answers than when constant average profits and straight-line depreciation are used in figuring profitability by this method.

Method shortcomings: failure to account for the effect of profits and depreciation accruals after the project pays out; only fixed investment is accounted for, as has been mentioned.

Of the three methods described so far, payout time alone takes into partial account time value of money. When projects are measured by the following methods, however, interest rates are applied to present and future cash flows to reflect more fully their time value.

When management invests company funds in a project, that project, in effect, is a borrower or debtor, as far as the company is concerned. Just as management expects to receive interest from any investment, it expects to receive profits from a project. These profits may be expressed as an interest rate earned on the investment, just as the banker expresses his profits through interest.

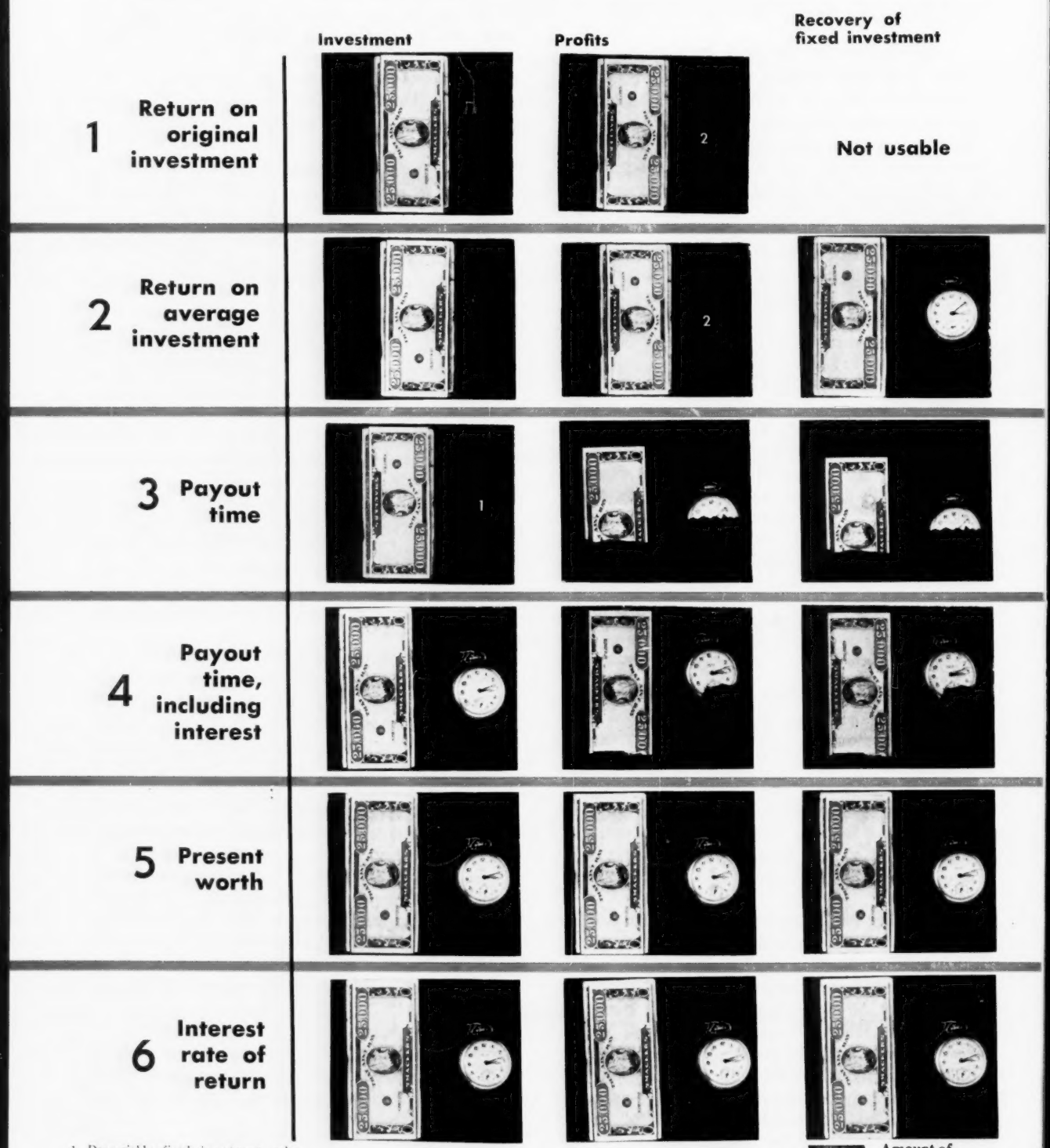
This interest should not be confused with the interest charge on funds borrowed for a particular project.

Management should expect new investments to return at least the same average interest rate as does its existing investments.

Only the three newer methods of figuring profitability —payout time, including interest; present worth; and interest rate of return—take this concept into account.

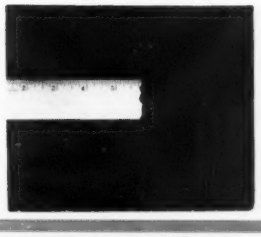
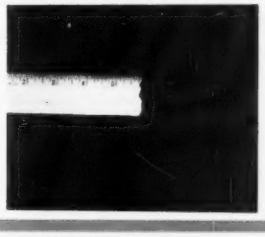
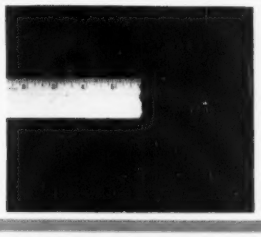
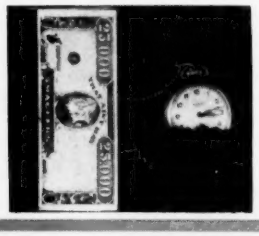
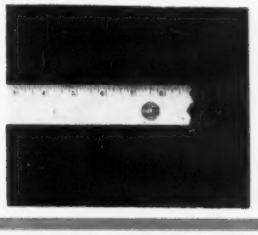
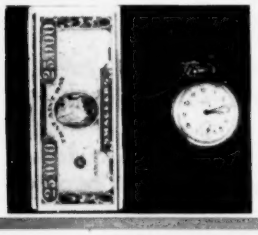
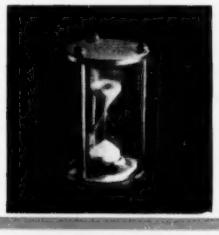
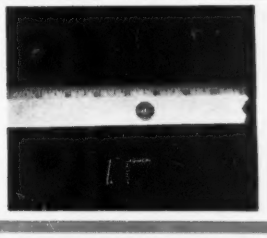
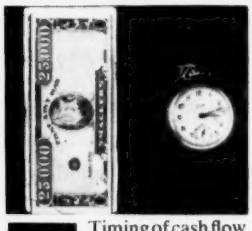
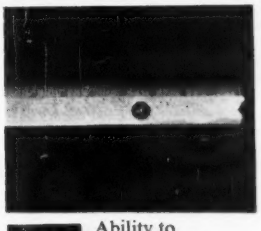
# How They Differ—

**. . . Comparing the six methods of calculating profitability on seven counts**




1. Depreciable fixed investment only.
2. Average annual profits over earning life of project.

**Here's what symbols mean: Broken symbols used when factors are only partly considered**

| Recovery of other investments | Relative time required to calculate profitability | Relative ease of understanding of method | How comprehensive is result as expression of profitability |
|---|---|---|---|
| Not usable | | |  |
| | | |  |
| Not usable | | |  |
|  | | |  |
|  |  | |  |
|  | | |  |
| Timing of cash flow | Sand passed indicates relative time required for calculation | Method that links amount of cash flow with its timing | Ability to express entire answer as one number |

# Make Your Own Rating Chart

*Based on the authors ideas.

| | Investment | | Profits | | Recovery of fixed investment | | Recovery of other investments | | Relative time required to calculate profitability by these methods |
|---|---|---|---|---|---|---|---|---|---|
| | $ | Timing factor | $ | Timing factor | $ | Timing factor | $ | Timing factor | |
| Ideal relative weights | 20 | 5 | 20 | 10 | 15 | 5 | 3 | 2 | 3 |
| Return on original investment | 20 | 0 | 20 | 0 | 0 | 0 | 0 | 0 | 3 |
| Return on average investment | 20 | 0 | 20 | 0 | 10 | 2 | 2 | 0 | 3 |
| Payout time | 20 | 0 | 10 | 5 | 8 | 2 | 0 | 0 | 3 |
| Payout time, including interest | 20 | 5 | 15 | 8 | 12 | 3 | 3 | 1 | 1 |
| Present worth | 20 | 5 | 20 | 10 | 15 | 5 | 3 | 2 | 1 |
| Interest rate of return | 20 | 5 | 20 | 10 | 15 | 5 | 3 | 2 | 1 |

## 4—Payout Time, Including Interest

**One of the newer methods** taking into account the time value of money in the four main cash-flow areas, this system judges profitability in terms of the number of years required to recover both depreciable fixed investment and a minimum return (interest rate) on the outstanding investment (*see table, p. 118*).

As in the payout-time method, income from both profits and depreciation accruals is included. The method is, in fact, a modification of payout time—utilizing compound interest to reflect further the time value of money. Interest charges are set at the minimum rate of return acceptable to the company.

The modified payout time so estimated is compared with the expected useful life of the project. If it is shorter than a reasonable estimate of the project's life expectancy, the earning power of the project will be in excess of the assumed return rate. If the payout time, including interest, is longer than the expected useful service life, the project yields less than the minimum acceptable return rate.

A year-by-year forecast of costs, sales and profits may be applied in this method for the period of the payout time, including interest. If the project is worth considering at all, the payout time, including interest, will occur before the anticipated end of the project life.

In one sense, the method is weak in its inability to show the value of profits received after that time. In another sense, this may be considered an advantage, since it precludes the necessity of having to make a firm estimate of the project's earning life (at best, a difficult value to predict).

Example: payout time on a project, not considering interest, might be three years, and payout time, including interest, seven years. If process technology in the field is not changing rapidly, and if no great corrosion problems are foreseen, the process might be expected to continue in operation more than seven years —perhaps eight or ten years. Payout time, including interest, would show, therefore, greater expectation of earning than the minimum rate of return applied.

If, however, payout time were five years and payout

A sample rating* showing how to minimize guesswork in selecting the best method of calculating profitability.

| Relative ease of understanding of method | How comprehensive is result as an expression of profitability | Total score |
|---|---|---|
| 7 | 10 | 100 |
| 7 | 3 | 53 |
| 5 | 3 | 65 |
| 7 | 3 | 58 |
| 1 | 5 | 74 |
| 1 | 8 | 90 |
| 1 | 8 | 90 |

time, including interest, were eleven years, this would indicate less than the minimum desirable rate of return. since the project is not expected to continue in operation for the full eleven years.

## 5—Present Worth

**Another of the newer methods,** this one is sometimes called "venture worth" or "incremental present worth." It judges profitability by comparing the investment with the value (as of now) of all cash flows to the project. Present worth refers to the discounting technique utilized to apply interest and determine the present value of cash flows. Cash flows are discounted either at the company's cost of capital or at a minimum acceptable rate of return to show their value at the time of investment. This yardstick (*see table, p. 118*) can be expressed either as a ratio (present value to investment) or as a difference (present value minus investment).

The difference between present worth of income and the total investment becomes a dollar measure of profitability rather than one that is expressed, as in the other five methods, as a time period or as a rate of return. The ratio is an index similar to rate of return.

A positive difference between present worth of income and investment measures the project's income potential over and above the cost of capital or the minimum desirable earning rate of return. This would yield a present value ratio greater than one. If the present worth of income equals the investment, the project earns exactly the interest rate applied (ratio equals one). A negative difference indicates less earning potential than the interest rate applied (ratio less than one).

A variation of application of this method is in the use of the ratio of the dollar difference to the original investment.

In the present-worth method, time and money are effectively integrated. Full use can be made of year-by-year forecasting. One disadvantage, however: the dollar value of the difference between present worth of earnings and investment bears no direct relationship to the magnitude of the original investment. This difference, therefore, cannot be compared directly with similar differences calculated for investments that compete simultaneously. The objection is overcome, at least in part, by using the ratios described for comparing profitability of competing projects.

Example: a $100,000 present-worth difference on a $100,000 investment project might seem sizable, but the same $100,000 present-worth difference on a $10-million investment project would seem skimpy. Expressed as the ratio shown in the table (*p. 118*), the first answer would be 2.0; the second, 1.01.

## 6—Interest Rate of Return

**This method** has been variously called the "investor's method," "discounted cash-flow method," and "profitability index."

It relies on the average rate of interest earned by the project to gauge the project's profitability. Put another way, it is the interest rate at which the company's investment is repaid by proceeds from the project.

In effect, the method figures the maximum rate at which funds might be borrowed for investment in a proposed project and still have it break even at the end of the project's expected life. It is the ratio of average annual profits (during the investment period plus the earning life of the project) to the average investment by the company in the project, including interest accruals (*see table, p. 118*).

In judging profitability, interest rate of return is compared with (1) some standard rate of return chosen as a minimum, or (2) with the cost of capital to the company. Solutions are generally by trial and error or by graphical interpolation. As with present worth, full use can be made of year-by-year forecasting.

This method has the primary advantage (as does the present-worth yardstick) of reflecting both the dollar and time values of all money involved in a project. On the other hand, it has a drawback similar to the present-worth method in its inability to make completely reliable comparisons between projects with differing over-

all lives. Like present worth, it cannot indicate the order of magnitude of the investment to be made.

Example: a small investment might be proposed at a 40% interest rate of return. However, the commitment of this small investment might make it impossible to invest in a much larger project of a 25% rate of return because of limited available funds. Therefore, the project with the highest rate of return should not be accepted without consideration of its effect on alternative investments.

Calculations of interest rate of return take longer than the other two interest-type methods because of the trial-and-error solution—however, no more than five or ten minutes. Graphical solutions can be developed for the more common types of cash flows to avoid the need for trial-and-error.

## How They Differ

**In order to avoid** as much personal opinion as possible in a comparison of methods, a table (*see pp. 120, 121*) has been used that includes findings derived mostly from basic literature references supporting the various methods.

This table compares the six yardsticks (listed vertically at the left) with seven important factors (listed across the top). Other factors might be added, but those in this table represent the key ones that bear on the selection of a profitability method. They are, in fact, the factors that have been mentioned in discussing the ideal yardstick.

Four of the factors (left to right, across the top of the table) represent the major types of cash flows that can occur in any project (investment, profits, recovery of fixed investment, recovery of working capital and other investments). The project's profitability will be affected by differences in the dollar values or timing of every one of these cash flows.

Symbols have been used to indicate at a glance each method's ability to allow for the cash flow, its timing, or both. The dollar bill shows whether or not each method measures entirely or partly the amount of a particular cash flow. When dollar values are not completely measured by a method, a portion of the dollar bill is shown.

Similarly, if the timing of the cash flow can be reflected by the method, a clock face is shown. When the method can measure only a portion of the time value involved, a broken clock symbol is shown.

Those methods that link the effect of time and money by means of compound interest have the dollar bill linked to a clock by a chain.

A brief discussion of the seven factors may be helpful.

**Investment:** As has been mentioned, all profitability measures of any consequence take into account the dollar amount of investment. All six methods discussed make full use of the amount.

Investment funds also vary as to the period of time over which they are spent. The time span of an investment affects its worth as a venture. The table shows how well each yardstick credits investments that begin to produce immediately (e.g., acquisitions), as opposed to investments involving extended periods before profits are received (e.g., new plant construction).

The first three profitability methods could be modified to reflect the timing of investments by including this time in the total time period (either project life or payout time). In practice, however, these methods assume that an instantaneous outlay of investment is made. That's why no clock face is shown for these methods under the "investment" column.

**Profits:** Since profits (or hopes of profits) underlie all investments, most methods might be expected to include the total dollar value of profits—and they do, as the table shows.

Profits from a plant are seldom, if ever, constant over the life of that plant. Sales volume sometimes starts out slowly and builds up fairly steadily for the remainder of the project's life. In other cases, big sales in early years taper off to lower sales and incomes later, as competition moves in on the new product.

Forecast differences in profit timing usually have a bearing on a decision to accept or reject a proposed venture. The table shows which yardsticks account for the timing of profits and which do not. The greater the portion of the clock face included, the more the method utilizes year-by-year profit forecasts.

**Recovery of Fixed Investment:** In allowing plants to pay for themselves out of profits, via depreciation, the federal government has provided an added income from any investment. This income is as real as profits.

The table shows which methods account partly or fully for the total depreciation dollars generated by an investment.

Under the 1954 tax law providing for fast depreciation write-offs, a variable time element is introduced. Fast write-off methods do not alter the total amount of depreciation returned. However, they do allow for larger returns in the earlier years of the project's life, less in later years. Those methods that show the advantage of this early return are shown with clock faces or portions thereof in the depreciation column.

**Recovery of Other Investment:** At the end of its useful life, a project usually has some cash value in the form of working capital, land, equipment salvage value, etc. Presumably, this can be converted into cash at the completion of the project, or credit taken if a new plant is built to replace the old one.

These recoveries of capital normally occur in the distant future. They are, therefore, less significant than the factors previously discussed. However, they do have some effect, and once again the clock face is used to symbolize how well the methods consider the timing of these recoveries. Note: some methods in the table do not reflect these recoveries.

**Calculation Time:** While certain factors, such as calculation time, ease of understanding and completeness of interpretation do not alter a method's ability to ab-

# Want to Know Still More About Figuring Profitability?

Here's a list of 19 selected references. Double check (√√) indicates special emphasis on method.

| | Return on Original Investment | Return on Average Investment | Payout Time | Payout Time Including Interest | Present Worth | Interest Rate of Return |
|---|---|---|---|---|---|---|
| Aries, R. S., Newton, R. D., "Chemical Engineering Cost Estimation," McGraw-Hill, New York, 1955. | ✓ | | ✓ | | | |
| Davis, T. C., American Management Assoc., New York, Financial Management Series No. 94 (1950). | ✓✓ | | | | | |
| Dean, J., "Capital Budgeting," Columbia University Press, New York, 1951. | | | ✓ | | | ✓✓ |
| Dean, J., "Measuring the Productivity of Capital," Harvard Business Review, Jan.-Feb. 1954. | | ✓ | ✓ | | | ✓✓ |
| Gordon, M. J., "The Payoff Period and the Rate of Profit," J. Business, Oct. 1955. | | ✓ | ✓ | | | ✓ |
| Grant, E. L., "Principles of Engineering Economy," Ronald Press, New York, 1930, 1938, 1950. | | | ✓ | | ✓ | ✓ |
| Happel, J., "New Approach to Payout Calculations," Chemical Engineering, Oct. 1951. | | | ✓ | ✓✓ | | |
| Happel, J., "The Venture Worth Method for Economic Balances in Chemical Engineering," Chemical Engineering Progress, Dec. 1955. | | | | | ✓✓ | |
| Hill, H. G., Jr., "A New Method of Computing Rate of Return on Capital Expenditures," H. G. Hill, Berwyn, Pa., 1953. | | ✓ | ✓ | | | ✓✓ |
| Lorie, J. H., and Savage, L. J., "Three Problems in Rationing Capital," J. Business, U. of Chicago, Oct. 1955. | | | | | ✓✓ | ✓ |
| Martin, J. C., "Economic Analysis," pp. 82-102 in "Chemical Process Economics in Practice," Reinhold, New York, 1956. | | ✓ | ✓ | | ✓ | ✓ |
| Reul, R. I., "Newest Way to Figure Payoff," Factory Management and Maintenance, Oct. 1955. | ✓ | ✓ | ✓ | | | ✓✓ |
| Rohleder, G. V., "Evaluating Investments by the Discounted Cash Flow Method," World Oil, Sept. 1955. | | ✓ | ✓ | | | ✓✓ |
| Scheuble, P. A., Jr., "How to Figure Equipment Replacement," Harvard Business Review, Sept.-Oct. 1955. | | | | ✓✓ | | |
| Schweyer, H. E., "Process Engineering Economics," McGraw-Hill Book Co., New York, 1955. | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Solomon, E., "The Arithmetic of Capital-Budgeting Decisions," J. of Business, April 1956. | | | | | ✓ | ✓ |
| Theusen, H. G., "Engineering Economy," Prentice-Hall, New York, 1950. | | | ✓ | | ✓ | ✓ |
| Weaver, J. B., and Reilly, R. J., "Interest Rate of Return for Capital Expenditure Evaluation," Chemical Engineering Progress, Oct. 1956. | ✓ | ✓ | ✓ | | | ✓✓ |
| Winn, F. W., "How to Invest Your Capital for Profits," Petroleum Refiner, July 1956. | | | ✓ | | ✓✓ | ✓ |

sorb and express information, they are important, nevertheless. Intangible factors like these determine the relative ease with which a profitability measure can be used, how well it can be understood and how comprehensively it gives the desired answer.

In the table, hour glasses are used to indicate the relative times required to make the final profitability calculation by each method. Calculations take only a few minutes by any one of the methods, once initial familiarity is gained with the technique and data is available in suitable form.

Before the final calculation of profitability, estimates and forecasts are required. Once data is available in the proper form, the final calculation by any of the six methods described is a relatively simple matter, especially when compared with the estimating procedures needed to arrive at feed-in data.

**Ease of Understanding:** Facial expressions are used in the table on pp. 120, 121 to give some idea of initial ease of understanding of each method. As the table shows, for example, return on original investment and payout time, the two most commonly used methods, are generally quickly understood by management. Return on average investment, probably less widely used, takes more thought for understanding. The three less-common methods reconcile more information, but are probably the most difficult to understand, at least initially.

**How Comprehensive a Result?** The last set of symbols in the table indicates that none of the yardsticks in itself is a completely comprehensive measure of a given investment proposal. The length of the ruler shown suggests the degree of "self-sufficiency" of each method. Some additional information is always needed to compare projects of different earning life, of different size of investment, etc. No method gives a single number that shows the effect of the project on the company's future earnings.

## Take Your Pick

**A key question still remains unanswered:** How do you choose the best method of gauging the probable profitability of investment projects? Different experts would probably choose different methods, depending on their familiarity with them, as well as their personal views on the importance of the many factors.

But, after weighing the various pros and cons of each method, anyone can prepare a numerical rating table similar to that shown on pp. 122, 123, listing the methods (vertically at the left) and the seven important factors (across the top).

The first step in such a rating system is to assign weights that, in the opinion of the evaluator, reflect the relative importance of the comparison criteria. These numbers, then, represent the ratings that the ideal yardstick would receive. Factors considered most important are assigned the highest ratings and the rest are weighted in relation to these.

## About the Authors

ALAN BATES (M.S., Chem. Eng., MIT, '51) and JAMES WEAVER (M.S., Chem. Eng., MIT, '47) work as member and assistant director, respectively, of Atlas Powder Co.'s economic evaluation department. This central staff group evaluates proposed investments, explores investment-evaluation techniques.

Next, each of the six yardsticks is rated according to how well it stacks up against the ideal. The total weights (at the right) give the relative measure of the merits of each of the capital expenditure yardsticks.

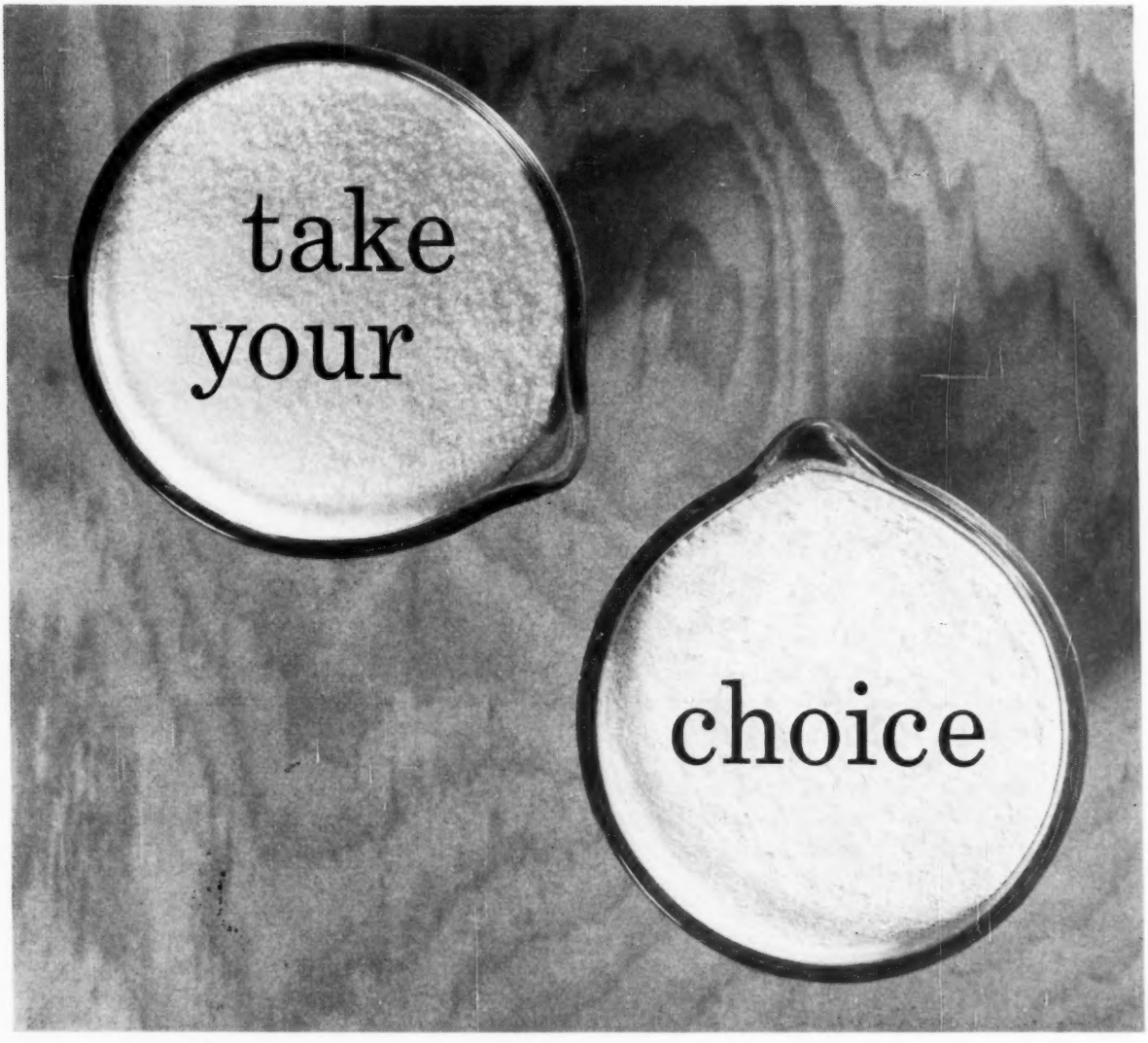
In this table (*pp. 122, 123*), numbers used to rate the yardsticks relative to the ideal measure (given a total score of 100) are for illustrative purposes; in actually approaching the profitability problem, one would likely select different weights. Nevertheless, the scores do generally reflect the points made in this report.

Note that the last three methods receive a much-higher rating than the first three. They alone account for the time-money relationships that seem so important in profitability studies.

Which of the profitability yardsticks discussed here is your company using to help judge profitability? Will its consistent use be in the best interest of the company? These questions are being probed in many companies.

Men in chemical management should take a careful look at the profitability problem now. Perhaps none of the chemical engineering economists will completely remove nagging doubts that still more information is needed. Continuing study and continuing improvement of methods of measuring profitability is far preferable, however, to overconfidence that weak but simple methods may instill.

**Fine Granular...or Powder Form?**

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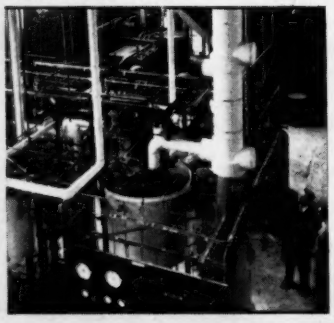

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# Market Newsletter

CHEMICAL WEEK
June 15, 1957

**Opposition to the Eisenhower minerals program is building up.** Being especially hammered is the Interior Dept.'s plan for so-called flexible (and higher) excise taxes on lead and zinc imports to prop domestic prices (*CW Market Newsletter, June 8*). The criticism, however, is two-sided.

On the one hand, the proposals are labeled "pitifully inadequate" by some Congressional leaders and by the domestic mining industry; on the other, spokesmen for foreign countries who depend on the U.S. market fear the program will deal "mortal blows" to the mining segments of their economy. Canada, Mexico, Australia and Peru have already registered scorching denunciations.

The long-range program—up before the Senate Interior Committee for hearing—calls for "sliding-scale" import excise taxes on lead and zinc, production bonus payments for beryl, chromite and columbium-tantalum. It does not include any specific new aid for tungsten or fluorspar. Also on the agenda: increased government activity in exploration, research and development work on all strategic metals and minerals.

In reply to domestic criticism of the program—that it doesn't go far enough—Interior Secretary Fred Seaton explains that it "is the best he could do now" and still get unanimous support from the White House and the Treasury and State Depts.

Chances are, though, Congress will toss aside the Administration's proposals, write its own program that will include some aid for a broader range of metals than Seaton now thinks necessary. But if the Senate committee liberalizes the plan too much, he warns, the result could be no program at all—e.g., through a presidential veto.

**Meanwhile, another ½¢/lb. has been cut from U.S. zinc tags.** The price cut, initiated by a leading custom smelter last week, sets the prime Western-grade tag at 11¢/lb. (East St. Louis). That's a full 2½¢/lb. lower than prices in effect just a couple of months ago.

•

**Some chemical product prices are also coming down.** Among them: polystyrene, styrene-butadiene latexes, some red cadmium lithopone colors.

Dow last week posted 1½¢/lb. reductions on general-purpose grades of crystal polystyrene (in bags), and ½¢/lb. cuts on color polystyrene. The changes bring the base price of the crystal material, in truckload bag shipments, down to 26¢/lb. effective July 1. On the same date, Dow will lower, by about 1½¢/lb., its delivered price of tank-car lots of styrene-butadiene latexes. These alterations, of course, tie in with upcoming reductions in styrene monomer tags.

**Chief reason for the cuts in the cadmium colors is lower selenium** costs. Reductions in the red colors, used primarily in the automotive industry, range from 4¢ to 19¢/lb.

Selenium has undergone a remarkable switch in supply/demand status. Up to late in '56, it consistently ranked among the top tight items, with resellers, at one point, commanding a 100% premium above manufacturers' prices of $15.50/lb. (*CW Market Newsletter, Feb. 11, '56*).

Greater production, spurred by the attractive returns plus sharp competition from germanium and silicon (as far as electrical rectifier usage is concerned), combined to bring selenium's demand more in line with supply. And in the process prices have skittered. Two cuts, one in January, the other late last month, knocked the commercial-grade tag down to the current $10.50/lb. at the makers' level. Resellers aren't touching the material—no room for premium profits.

•

**The third quarter will bring some higher price schedules, too.** Among those being advanced are drum prices on two industrial amines, ethylamine 70% and isopropylamine; vinyl acetate monomer and polyvinyl acetate emulsion; activated carbon; synthetic ammonium sulfate.

No changes are being posted on tank prices of the amines, but ethylamine in c.l. will be upped 1¢/lb., to 38½¢/lb., and l.c.l. by 1½¢/lb., to 40¢; isopropylamine in c.l. drums will be increased by 2½¢/lb., to 37¢, and l.c.l., 3½¢/lb., to 39¢/lb.

**There's no word yet on new prices of coke-oven ammonium** sulfate, but at least one synthetic-sulfate maker, Monsanto, will raise tags on granular, 21% nitrogen material by $2/ton for the period July 1, '57, to June 30, '58.

The new synthetic ammonium sulfate quotes: $34/ton, bulk, car lots; $39/ton, 100-lb. and 80-lb. multiwall paper bags, f.o.b. El Dorado, Ark.

**SELECTED PRICE CHANGES — WEEK ENDING JUNE 10, 1957**

**DOWN**

| | Change | New Price |
|---|---|---|
| Molasses, blackstrap, feed grade, tanks, New Orleans, gal. . . | $0.005 | $0.21 |
| Phosphate rock, Florida, land pebble, run-of-mine, washed, dried, unground, 66-68%, b.p.l., bulk, c. l., mines, long ton | 0.045 | 5.1625 |
| Tankage, animal feeding, 9-11% ammonia, Chicago, bulk, unit ton | 0.25 | 5.75 |
| Tin metal (Straits) | 0.0025 | 0.98375 |
| Zinc dust, pigments, bbls., c.l. works | 0.005 | 0.155 |
| Zinc metal, prime Western slabs, E. St. Louis | 0.005 | 0.11 |

**All prices per pound unless quantity is stated.**

Where odor is a problem use these

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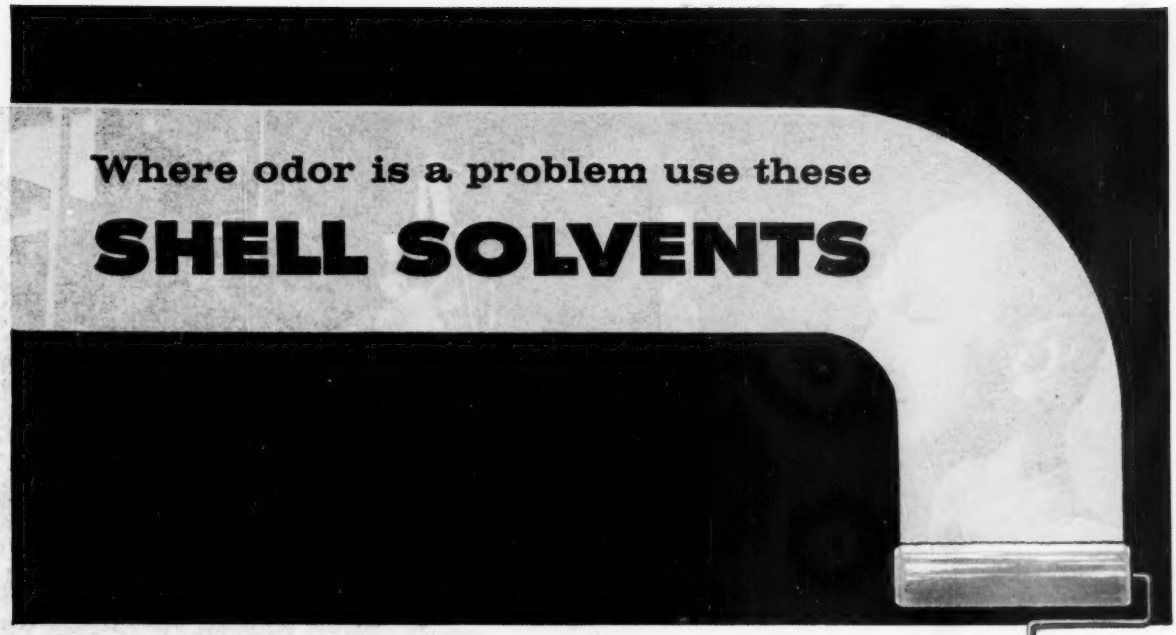

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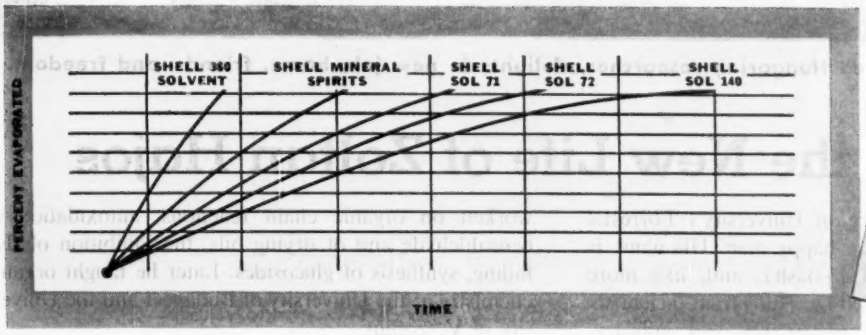

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SHELL

**Zoltan Hajos, transplanted Hungarian researcher, delights in new job, home, friends—and freedom.**

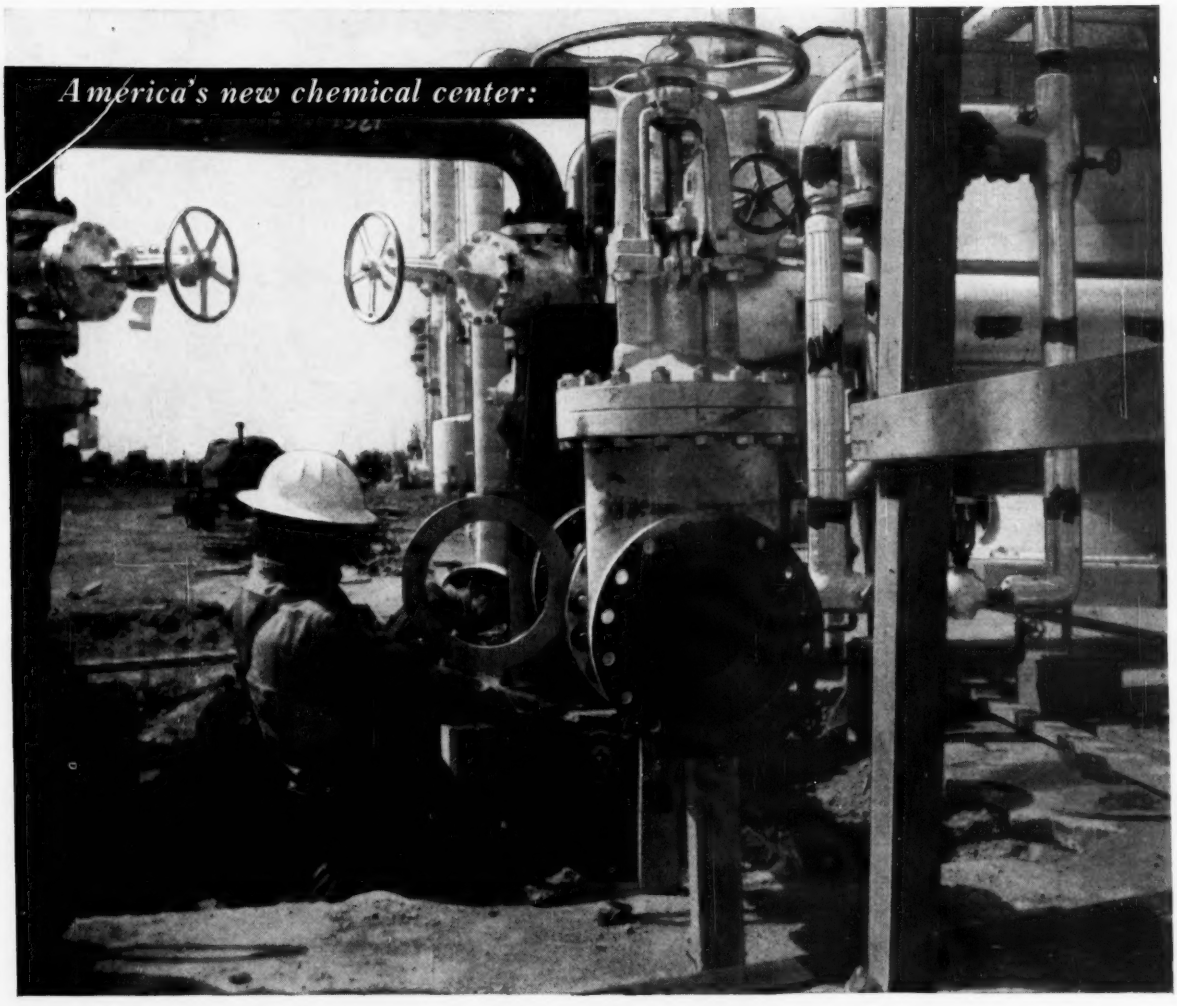
# A Look at the New Life of Zoltan Hajos

IN A laboratory at Princeton University's Forrestal Research Center works a happy man. His name is Zoltan Hajos (pronounced hi-oash); and, like more than a thousand of his fellow Hungarian scientists newly assimilated by U.S. universities and industry, he is grateful to be alive—and free.

Young Hajos is typical of the technically trained newcomers whose rigorous education fits them particularly well for research jobs. He received his doctorate in 1949 from the University of Technical Sciences in Budapest. During 10 years of research there, he worked on organic chain reactions, autoxidation of benzaldehyde and of drying oils, the inhibition of dye fading, synthesis of glucosides. Later he taught organic chemistry at the University of Budapest and the University of Veszprem.

Now he is a research associate, working for Prof. E. C. Kendall, Nobel prize winner in physiology and medicine. Kendall, in his own words, is "most appreciative of Hajos's long experience and fine technique—and his ability to speak English."

Hajos considers Kendall "much more than a boss—

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really a friend." He says, "My wife and I ate with the Kendalls until we set up our own place, which Dr. Kendall helped us to find. He has been very thoughtful."

Near the edge of town (Princeton, N.J.) stands Hajos's new home, a neat, grass-encircled white frame house, part of a university-owned housing area. "Family life here in America is wonderful," Hajos finds. "People here do not have to go out to enjoy themselves, they have so much at home." He's amazed, too, at the variety of food available in local shops, marvels, "I can eat Spanish food today and Chinese food tomorrow, and all in my own home."

While in Hungary, Hajos corresponded with Americans. His decision to flee Hungary came as the recent revolt raged. With 200 others, he and his wife boarded a train for the Austrian frontier. Only six of the group managed to cross the border.

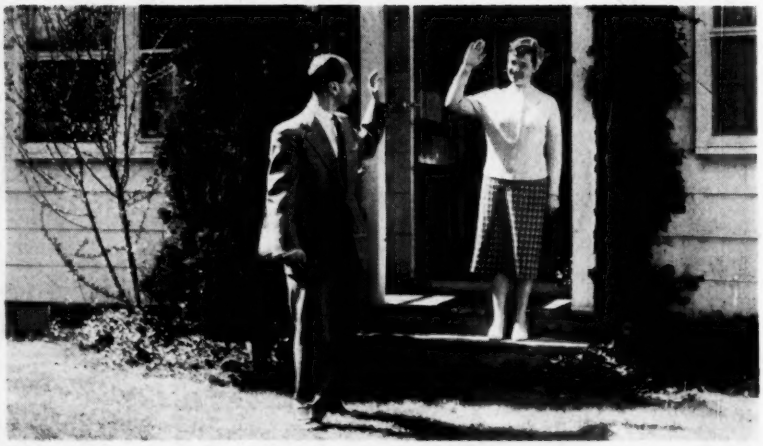
The route to Princeton was via Vienna, Bremerhaven (Germany), Camp Kilmer, N.J., and Yonkers, N.Y. The Hajos's were sponsored by the National Catholic Welfare Committee and by the National Academy of Sciences (who helped find him his position). In Princeton, he enjoys the company of countrymen Prof. E. Pacsu (department of chemistry) and A. Zalay at the Textile Research Institute.

"Research in Hungary," explains Hajos, "is a much more difficult task than it is here. Equipment is hard to get, must be applied for at an appropriate ministry, bought from Hungarian manufacturers to bolster the economy. If not available, a new request to get it from abroad must be made. This may cause a long delay. Equipment-sharing is prevalent."

Also, a new academic system requires that researchers pass examinations in political doctrine as well as in sciences. "Young people," Hajos says, "remain interested in the sciences, however, because they offer a better standard of living. As a research worker, I never starved. But a luxury, such as a car, was far beyond my pocketbook."

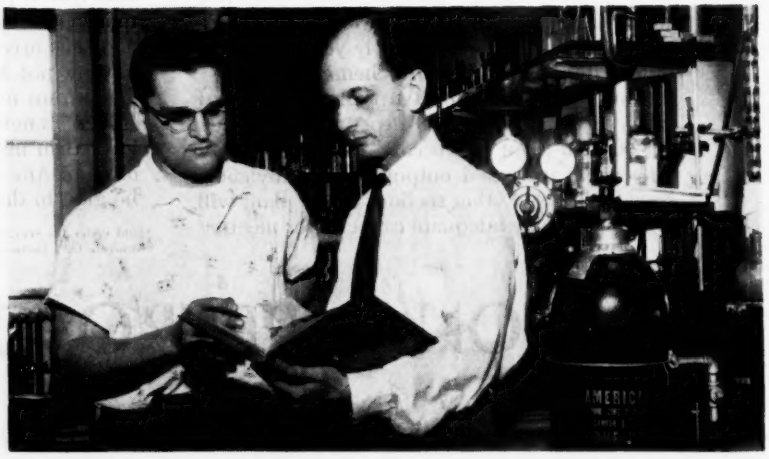
Hajos now drives a 1952 Dodge, looks to the future with optimism. He prefers academic surroundings, thinks he may turn to some teaching "when my English improves."

Considering that the Soviet system



**Farewell to wife marks the start of Hajos's busy day.**

**Visiting countryman A. Zalay at Princeton's textile institute.**



**In tackling project, Hajos brings rigid training to bear.**

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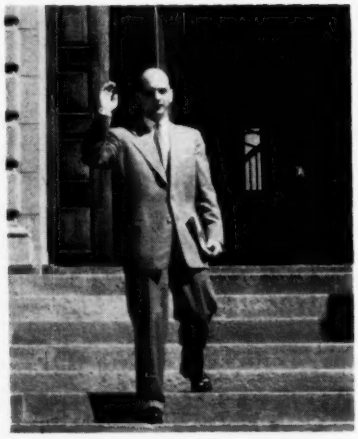
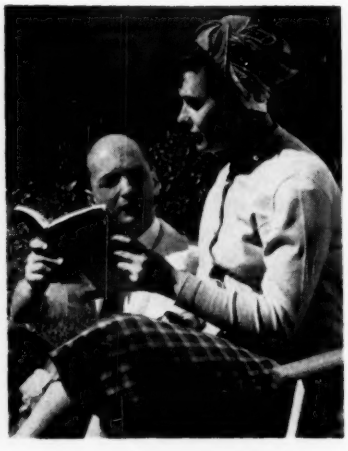


**Day's end at the laboratory.**



**Teaching English to wife.**

forbids the teaching or learning of English, Hajos's grasp of the language is surprisingly good. He has been teaching his wife (a daily ritual) and she can now shop without assistance. Moreover, many—if not most—of the incoming Hungarian scientists speak not only English but also French and German. This may be a big factor in the National Academy of Sciences' new move to screen an estimated 1,000 more textile chemists, lipid chemists, nuclear physicists, architectural designers, etc., from Hungarians in Vienna, fly them to the U. S. if they so desire.

Hungarian born or bred scientists (e.g., the H-bomb's Teller, von Neumann; Nobel prize winner Szent-Gyorgyi) have contributed much to American life. Zoltan Hajos and his newly relocated colleagues promise to carry on the tradition.

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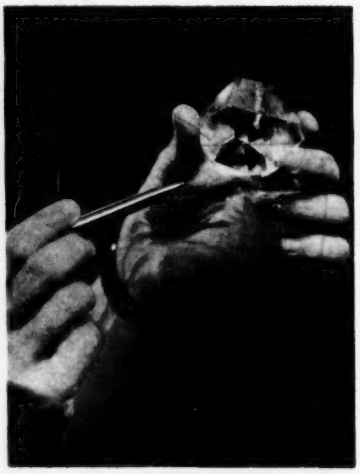

**TRIGLYCINE SULFATE: For barium titanate, a ferroelectric challenge.**

## Crystal Switch

**Bell Telephone Laboratories** (New York) has come up with a new crystal for use in electronic switching circuits and memory devices. It's triglycine sulfate, possible competition for barium titanate (*CW, June 25, '55, p. 64*), the most widely used ferroelectric* material to date.

Discovered by Bell's B. T. Matthias, triglycine sulfate is said to have some advantages over the titanate. It permits switching at a lower voltage; doesn't become "fatigued" on repeated switching; and a given area will retain a given polarization indefinitely without any deterioration, according to Bell.

Triglycine sulfate is stable chemically, does not decompose when exposed to moisture or atmosphere. It's also said to be strong enough to permit handling in thin sheets. (Large single crystals are grown easily. A large number of slices can be cut from each crystal.)

Above 47 C, however, the new material loses its ferroelectric properties, regains them when cooled. Bell has raised this critical temperature, called the Curie point, to 60 C by replacing some of the compound's hydrogen atoms with deuterium when the crystal is grown.

Only a very few ferroelectric materials are known to exist. Despite its latest discovery, Bell continues to look for new and better ones.

*Ferroelectrics are materials that can be switched rapidly from one polarization to another, retain polarization until switched.

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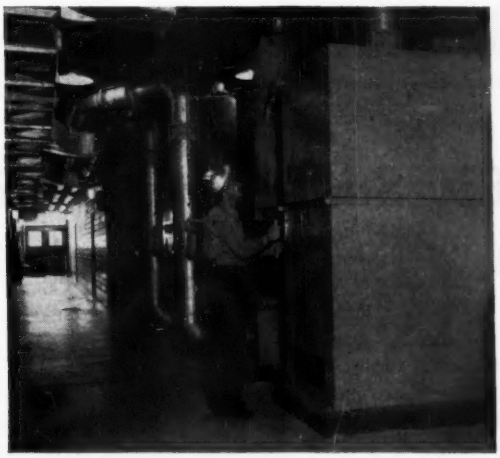

**Dracco Uni-Filters remove all foreign matter from conveying air before it enters the conveyor. This major polyethylene plant uses an Airstream Conveyor to move pellets from process to storage.**

*Dracco Bulletin 529, "Airstream Conveyors", contains detailed information on equipment and uses. Shows examples. For your copy, write Dracco today.*

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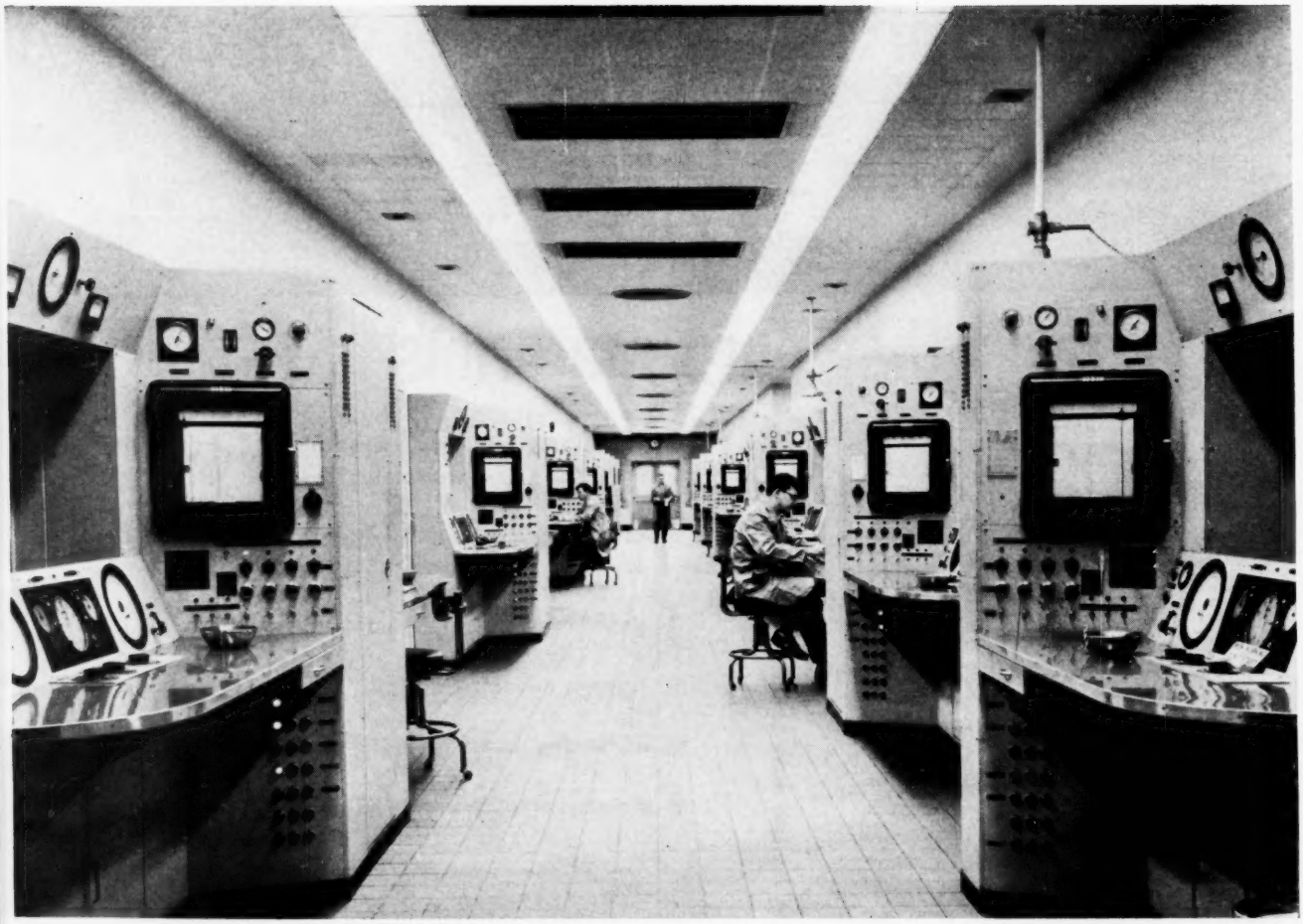

**Remote-controlled test engines put research of new fuels, lubricants, additives on push-button basis.**

# Big-Scale Prospecting for the Gold in Oil

LAST WEEK, Gulf Oil Corp. unveiled three new laboratories at its giant Harmarville, Pa., center that reflect the petroleum industry's growing reliance on chemical principles to expand the recovery and utilization of oil.

Each worth an estimated $3 million, the labs round out what Gulf believes is the largest (44 buildings on 53 acres) and most diversified research center in its field.

In one of these, the A. W. Mellon Nuclear Science Laboratory (*CW Technology Newsletter, June 8*), Gulf is harnessing the newest tools of its trade. Research projects: recovery of more oil by atomic detection methods, improvement of refining by radiation, tracer studies, and the creation of new products through nuclear energy.

Heart of the installation is a 3-mev. Van de Graaff particle accelerator, chosen because it is versatile, can supply beams of electrons, protons, neutrons or X rays. Two-thirds of the accelerator is below ground level, massive concrete walls (2 to 5 ft. thick) guard lab personnel. At the bottom, the business end of the accelerator is operated from a shielded control room. Samples to be irradiated revolve on a rotary table under the beam, are watched by closed-circuit television, handled by remote-control mechanisms.

About 12 scientists work in the building, which also includes a radio-chemistry laboratory for handling higher radioactive materials.

Like Atlantic Refining (*CW, Aug. 20, '55, p. 60*) and others, Gulf is probing the applicability of radiation to refining—getting higher-octane fuels at lower cost.

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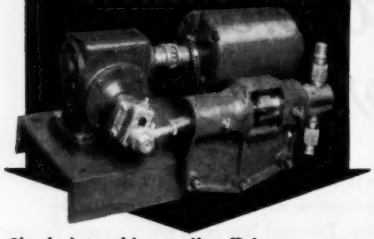

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## RESEARCH

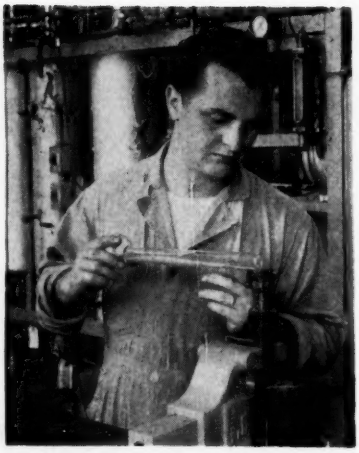
It's looking, too, at irradiated catalysts in the hope these will facilitate refining, cut catalyst costs. And the firm is hoping to turn up new chemical products produced by irradiation. Gulf has used irradiation to produce, from refinery gases, a gasoline component hexamethylethane that has a 130-octane rating. Cost of the chemical, so far, is prohibitive. But the find is providing incentive for further research in the same direction.

Gulf is using radioactive chemical tracers to track and shed new light on refinery processes, harnessing them (by what is now a well-established technique in the industry) to appraise engine wear and corrosion without time-consuming disassembling. The Nuclear Science Laboratory, supervised by T. J. Hardwick and W. E. Mott, is also probing radiation techniques of detecting and measuring oil impurities.

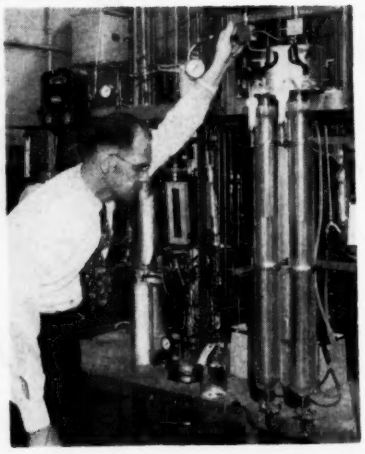
Designed primarily to improve methods of oil drilling, production and transportation, Gulf's new William Larimer Mellon Production Research Laboratory is also equipped with a chemical laboratory. Purpose: to experiment with chemical additives (e.g., alkalis and surface-active agents) for mud-drilling lubricants. So far, Gulf hasn't turned up the ideal additive, concedes that when and if it does, the market will be substantial. Another urgent problem the new lab will tackle is chemical plugging of boreholes against water-seepage.

Third of the new buildings is the R. B. Mellon Automotive Products Laboratory. Precision-designed and instrumented, it's claimed to be one of the world's most advanced facilities for research in automotive fuels, additives and lubricants. Heart of the installation is its corridor of engine test cells (*see cut, p. 140*), where operators observe tests through picture windows, record and control engine functioning. Tests may run 24 hours/day, 7 days/week, without interruption. Gulf, like its competition, aims to keep gasoline and lubricant development apace with planned higher-compression engines, new diesels, and turbines.

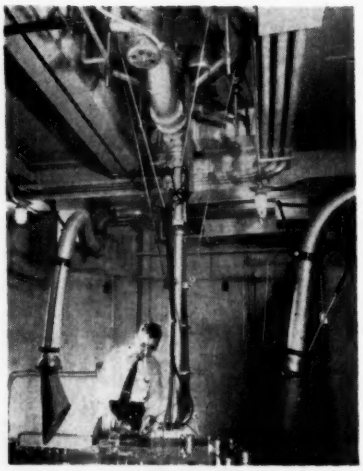
A feature of the lab is its "drive-in chassis dynamometer room," for all-weather studies on cars and buses. Temperatures can be set from -70 F to summer heat. (It takes 20 hours to drop the temperature from the high to the low limit.) Such petroleum prod-



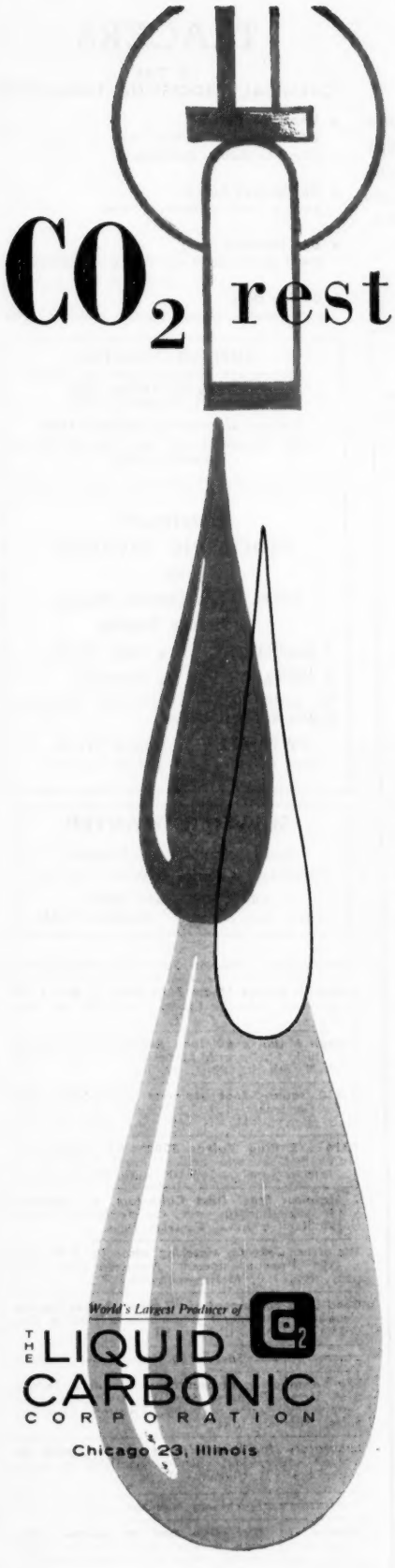
**CATALYST RESEARCH: Route to cost-cutting.**



**LAB REFINING: New process yields higher octanes.**



**HOPEFUL CHEMICALS await radiation beam test.**




# WHEN TAPS SLOWED TO A TRICKLE

# $CO_2$ restored the flow

A few years ago the water taps in one of our midwestern cities began to flow too gently. City engineers suspected the culprit was excess lime.

In the lime-soda ash process of water treatment it is customary to over-treat the water to assure maximum softening. This causes plugging of the water lines due to precipitation of the excess lime.

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Recarbonation of the treated water with $CO_2$ changed the lime to a more soluble form—and water pipes stayed free-flowing. The $CO_2$ system is successfully solving the lime problem in cities like Minneapolis, Minn., Columbus, Ohio, Eau Claire, Wis. and many other municipalities.

This is just one of hundreds of $CO_2$ applications that may lead you to a solution to one of your problems.

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Almost every day another manufacturer or processing plant finds that carbonic gas can improve the product, simplify an operation, cut cost, or increase safety.

$CO_2$ is now doing a job in such varied applications as these:

**Curing cores and molds for foundry castings**
**Making possible low cost gas shielded welding**
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**Improving paints and varnishes**
**Freeze-drying pharmaceuticals**
**A low cost, safe, weak acid for neutralizing**
**As an inert atmosphere to prevent fire and explosion**
**And hundreds of other applications**

Some of these may be of direct interest to you, others may be adaptable to your field. If you'd like a broader list, we'll be glad to send you our booklet "$CO_2$ Applications Unlimited". Just check it on the coupon below. If you'd like detailed technical data on any of the applications listed in this advertisement, check those in the coupon too.

☐ Curing Cores and Molds
☐ Rubber Tumbling
☐ Freeze-Drying
☐ Gas Shielded Welding
☐ Paint and Varnish Manufacture
☐ Other_____

**THE LIQUID CARBONIC CORPORATION**
3104 South Kedzie Avenue • Chicago 23, Illinois

Please send me a copy of "$CO_2$ Applications Unlimited" plus detailed information on the indicated uses of $CO_2$.

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### Position Vacant

***Opening for research and development chemist*** experienced in the manufacture and various uses of protective coatings, wax, wax compounds, resins, polymer dispersions, plastic, and bituminous materials in industrial manufacturing company laboratory located in Middle West. Apply by letter giving full details of education and experience. All replies will be confidential. P-5213, Chemical Week.

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***Sales and Marketing, many years domestic and*** overseas sales industrial chemicals and allied products, good knowlededge export markets, well traveled. PW-5303, Chemical Week.

***Chemical Sales: Currently in charge of market*** development for the division of a national company serving the chemical and petroleum industries. Company sales sixty million. Nationwide acquaintanceship among responsible research, production, and purchasing personnel. PW-5359, Chemical Week.

**DON'T FORGET**
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***To EMPLOYERS who advertise for MEN:***

When there are many applicants for a single position it frequently happens that the only letters acknowledged are those of the most promising candidates. Others may not receive any indication that their letters have even been received by a prospective employer much less given consideration. These men often become discouraged, will not respond to future advertisements, and sometimes question their bonafide character.

*Every advertisement printed in the Employment Opportunities Section is duly authorized.*

It will help to keep our readers interested in this advertising if you will acknowledge every application received, even if you merely return the letters of unsuccessful applicants with "Position filled, thank you" written or stamped on them.

We suggest this in a spirit of cooperation between employers and the men replying to Employment Opportunity advertisements.

*Classified Advertising Division*

**McGraw-Hill Publishing Co., Inc.**

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Count as one additional line in undisplayed ads.

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PLASTICIZERS, RESINS, DYES
SOLVENTS, PIGMENTS, ETC.
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***Louisville Rotary Steam Tube Dryer 6' dia. x 40'*** long. Late Model. Perry, 1415 N. 6th St., Phila. 22. Pa.

***Vulcan 6' dia. x 60' long Rotary Hot Air Dryer*** ½" thick Shell, with burner and motor. Perry, 1415 N. 6th St., Phila. 22, Pa.

***1-400 square foot stainless steel Sheel and*** Tube Condenser. 169-1" OD tubes 18 ga. x 115" long. Perry, 1415 N. 6th St., Phila. 22, Pa.

***T316 S/S Plug Valves 300# WP Lubricated,*** Durco flgd. & sock. weld. Unused. Sizes ½" to 4". Anchor Supply, 1742 4th South, Seattle 4, Wn.

***2 Stainless Steel Dust Collectors, 4' diameter*** x 14' long—Bargain price. Cherry Burrell Corp., Cedar Rapids, Iowa, Contract Dept.

***We offer: Coke for sintering, also: ⅜" x 1"; ½"*** x 1½". Prompt shipment. American Fuel Company, Box 150, McKeesport, Pa.

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***Laboratory facilities offered in N.J. with or*** without supervision, chemists available on short notice. SS-5321, Chemical Week.

### Machinery Wanted

***Wanted to Buy—One ball or pebble mill.*** Porcelain or high density lined. 750 to 1,000 gallons total capacity. Must be in good condition W-5353, Chemical Week.

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ucts as fuels, wheel-bearing greases and transmission lubricants can be evaluated here under conditions of actual driving.

Right now, Gulf research and development staffers are taking a leading role in a new hydroisomerization process for getting more high-octane gasoline out of a barrel of crude oil. The process upgrades the lightest liquid part of straight-run gasoline, pentane and hexane, rearranges them into isopentane and isohexanes. This changes the pentane portion from 88-octane (leaded) to around 106-octane, boosts the hexane leaded octane number from 65 to 95 or higher. Based on its research (plus that of Universal Oil Products Co.), Gulf plans to build a pentane hydroisomerization unit "in the near future." Key catalyst: platinum.

Research, Gulf feels—even at the $1 million/year it takes to run the Harmarville center—is paying off.

## PRODUCTS

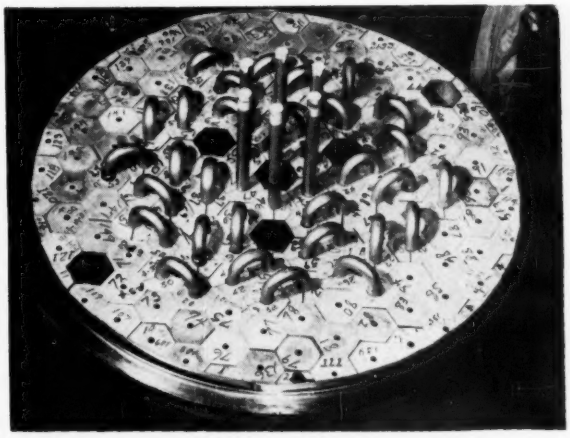
**Hot Entries:** Nucleonic Corp. of America (Brooklyn) is out with a complete line of radioactive isotopes that can be purchased in microcurie amounts without license from AEC.

•

**Plasticizers:** Two new esters (di-2-ethylhexyl isosebacate and di-n-butyl isosebacate) are being offered by Kessler Chemical Co. (Philadelphia). They are reportedly useful as plasticizers and in synthetic lubricants.

•

**Synthesis Tool:** Stauffer Chemical Co. now offers a new organic sulfur derivative, trichloromethanesulfonyl chloride in research quantities. The compound is expected to be useful as an intermediate in the manufacture of pharmaceuticals, dyestuffs, rubber chemicals, and lubricating oil additives.



**Reactor used in aircraft power system.**

# Good Omen for Atomic Aircraft

**Successful operation** of this experimental compact nuclear reactor (*top view, above*) bodes well for atomic powered aircraft. It was designed and tried out at Oak Ridge National Laboratory, which Union Carbide Nuclear Co. (division of Union Carbide Corp.) operates for the U. S. Atomic Energy Commission. A. M. Weinberg, director of the laboratory recently revealed that the reactor was brought to full power on Nov. 9, '54, ran at a peak output of 2,500 kilowatts, although designed for 1,500 kw. It ran continuously for more than 90 megawatt hours of operation (4 days and nights) before being dismantled.

The small (36 in. high, 33 in. in diameter) power plant glowed red from its high operating temperature. Its liquid uranium fuel entered at 1200 F, left the core at 1500 F. Heat generated in the moderator was removed by sodium, passed to water via an intermediate, high-velocity helium heat exchange.

Shown: 66 tubes, which carry fuel to the core; six upright fuel inlet tubes. Hexagonal units are beryllium-oxide moderator-reflectors.

# CHEMICAL WEEK • ADVERTISERS INDEX

## JUNE 15, 1957


**ALLIED CHEMICAL & DYE CORP. NITROGEN DIV.** ..... 16
Agency—G. M. Basford Co.

**ALLIS CHALMERS MFG. CO.** ..... 7
Agency—Compton Adv. Inc.

**AMERICAN CYANAMID CO.** ..... 29
Agency—Hazard Adv. Co.

**AMERICAN MINERAL SPIRITS CO.** ..... 51
Agency—Leo Burnett Co. Inc.

**ANSUL CHEMICAL CO.** ..... 28
Agency—Kenyon & Eckhardt, Inc.

**ARIZONA CHEMICAL CO.** ..... 65
Agency—Hazard Adv. Co.

**ARMOUR & CO.** ..... 4-5
Agency—Foote, Cone & Belding Inc.

**BAKER CASTOR OIL CO.** ..... 26
Agency—Doyle, Kitchen & McCormick Inc.

**BAKER PERKINS INC.** ..... 68
Agency—Prince, Tanner & Willox Inc.

**BALTIMORE & OHIO RAILROAD** ..... 81
Agency—Richard A. Foley Adv.

**BEMIS BRO. BAG CO.** ..... 54-55
Agency—Gardner Adv. Co.

**BLAW-KNOX CO.** ..... 2
Agency—Ketchum, MacLeod & Grove, Inc.

**BORDEN CO.** ..... 96
Agency—Fuller & Smith & Ross, Inc.

**CATALYTIC CONSTRUCTION CO.** ..... 66-67
Agency—Doremus-Eshleman Co.

**CELANESE CORP. OF AMERICA** ..... 91
Agency—Ellington & Co. Inc.

**CHEMICAL MANUFACTURING CO.** ..... 78
Agency—The House of J. Hayden Twiss

**CHICAGO & EASTERN ILLINOIS RAILROAD** ..... 52
Agency—Fuller & Smith & Ross, Inc.

**CONCORD CHEMICAL CO.** ..... 138
Agency—John B. Ferguson Jr. Adv.

**CONTINENTAL CAN CO.** ..... 60
Agency—Batten, Barton, Durstine & Osborn Inc.

**CROWN CORK & SEAL CO.** ..... 20
Agency—Aitkin-Kynett Co. Adv.

**DAVISON CHEMICAL CO.** ..... 23
Agency—St. Georges & Keyes, Inc.

**DAY CO., INC. J. H.** ..... 25
Agency—Strauchen & McKim Adv.

**DICALITE DIV. GREAT LAKES CARBON CORP.** ..... 82
Agency—Darwin H. Clark Co.

**DOW CHEMICAL CO.** ..... 63
Agency—MacManus, John & Adams, Inc.

**DOWELL, INC.** ..... 1
Agency—Rives, Dyke & Co. Adv.

**DRACCO CORP.** ..... 139
Agency—The Jayme Organization, Inc.

**EASTMAN CHEMICAL PRODUCTS** ..... 93
Agency—Fred Wittner, Adv.

**EMERY INDUSTRIES INC.** ..... 69
Agency—Ruthrauff & Ryan Inc.

**ENJAY CO.** ..... 47
Agency—McCann-Erickson Inc.

**ESCAMBIA CHEMICAL CORP.** ..... 113
Agency—Godwin Adv. Agency

**FISHER CHEMICAL CO., INC.** ..... 21
Agency—Freiwald & Coleman, Adv.

**FLUOR CORP.** ..... 85
Agency—Hixson & Jorgensen, Inc.

**FOSTER WHEELER CORP.** ..... 11
Agency—Marsteller, Rickard, Gebhardt & Reed, Inc.

**GENERAL AMERICAN TRANSPORTATION CORP. WIGGINS, DIV.** ..... 106
Agency—Edward H. Weiss & Co.

**GRAVER TANK & MFG. CO.** ..... 103
Agency—Ladd, Southward & Bentley, Inc.

**GREEFF & CO., R. W.** ..... 138
Agency—The House of J. Hayden Twiss.

**GRINNELL CO., INC.** ..... 83
Agency—Noyes & Co.

**HARSHAW CHEMICAL CO.** ..... 10

**HEAVY MINERALS, INC.** ..... 50
Agency—Molesworth Assoc.

**HERCULES POWDER CO.** ..... 31
Agency—Fuller & Smith & Ross, Inc.

**INGALLS SHIPBUILDING CORP.** ..... 45
Agency—Liller, Neal & Battle Adv.

**INTERNATIONAL MINERALS & CHEMICAL CORP.** ..... 95
Agency—C. Franklin Brown Inc.

**INTERNATIONAL SALT CO. INC.** ..... 109
Agency—Batten, Barton, Durstine & Osborn Inc.

**KELLOGG CO. THE M. W.** ..... 3rd Cover
Agency—Fuller & Smith & Ross, Inc.

**KOPPERS CO.** ..... 114
Agency—Vansant, Dugdale & Co., Inc.

**LIQUID CARBONIC CORP. THE** ..... 143
Agency—Fletcher D. Richards, Inc.

**McLAUGHLIN, GORMLEY KING CO.** ..... 138
Agency—Alfred Colle Co., Adv.

**METASAP CHEMICAL CO.** ..... 80
Agency—Lewin, Williams & Saylor

**MERCK & CO. INC.** ..... 147
Agency—Charles W. Hoyt Co. Inc.

**METAL HYDRIDES, INC.** ..... 128
Agency—Creamer-Trowbridge Co.

**METAL & THERMIT CORP.** ..... 44
Agency—RAS Adv., Inc.

**MICHIGAN CHEMICAL CORP.** ..... 111
Agency—Wesley Aves & Assoc.

**MILLMASTER CHEMICAL CORP.** ..... 136
Agency—The House of J. Hayden Twiss

**MISSISSIPPI AGRICULTURAL & INDUSTRIAL BOARD** ..... 62
Agency—Gordon Marks & Co. Inc.

**NATIONAL ANILINE DIV.** ..... 99
Agency—James J. McMahon, Inc.

**NATIONAL ALUMINATE CORP.** ..... 84
Agency—Armstrong Adv. Agency

**NATIONAL PETRO-CHEMICALS CORP.** ..... 133
Agency—G. M. Basford Co.

**ORONITE CHEMICAL CO.** ..... 97
Agency—L. C. Cole Co.

**OWENS ILLINOIS GLASS CO.** ..... 86-87
Agency—J. Walter Thompson Co.

**OXY-CATALYST, INC.** ..... 105
Agency—Gray & Rodgers Co.

**PENNSALT CHEMICALS CORP.** ..... 30
Agency—Sommers-Davis Inc.

**PETRO-CHEM DEVELOPMENT CO. INC.** ..... 24
Agency—Sam J. Gallay Co. Adv.

**PFIZER & CO. INC. CHARLES** ..... 127
Agency—MacManus, John & Adams Inc.

**PITTSBURGH COKE & CHEMICAL CO.** ..... 135
Agency—W. S. Walker Adv. Inc.

**PITT-CONSOL CHEMICAL CO.** ..... 104
Agency—RAF Adv., Inc.

**PITTSBURGH-DES MOINES STEEL CO.** ..... 27
Agency—Downing Industrial Adv. Inc.

**POWELL CO. THE WILLIAM** ..... 71
Agency—The Ralph H. Jones Co.

**PRITCHARD & CO. J. F.** ..... 64
Agency—Carter Adv. Agency Inc.

**PROCON INC.** ..... 79
Agency—Don Colvin & Co. Inc.

**PROPORTIONEERS, INC.** ..... 142
Agency—Horton, Church & Goff Inc.

**REICHHOLD CHEMICALS INC.** ..... 8-9
Agency—MacManus, John & Adams, Inc.

**ROHM & HAAS** ..... 73-76
Agency—Arndt, Preston, Chapin, Lamb & Keen Inc.

**RUBBER CORP. OF AMERICA** ..... 136
Agency—Ovesey & Straus, Inc.

**SHELL OIL CO.** ..... 131
Agency—J. Walter Thompson Co.

**SOLVAY PROCESS DIV. ALLIED CHEMICAL & DYE CORP.** ..... 2nd Cover
Agency—Atherton & Currier Inc.

**SOLVENTS AND CHEMICAL CORP.** ..... 12
Agency—Edward H. Weiss & Co.

**L. SONNEBORN SONS, INC.** ..... 141
Agency—St. Georges & Keyes, Inc.

**SOUTHERN STATES IRON ROOFING CO.** ..... 13
Agency—George & Glover Adv.

**STONE & WEBSTER ENGINEERING CORP.** ..... 59
Agency—Harold Cabot & Co., Inc.

**STRAN-STEEL CORP. NATIONAL STEEL CORP. DIV.** ..... 72
Agency—Campbell-Ewald Co.

**SUN OIL CO.** ..... 53
Agency—Ruthrauff & Ryan Inc.

**SWIFT & CO.** ..... 101
Agency—Russell T. Gray Inc.

**TITANIUM METALS CORP. OF AMERICA** ..... 56
Agency—W. L. Towne Adv.

**TITANIUM PIGMENT CORP.** ..... 32
Agency—Doyle, Kitchen & McCormick

**TRUBEK LABORATORIES, INC.** ..... 19
Agency—Ray Ellis Adv.

**UNION CARBIDE CHEMICALS CO. DIV. OF UNION CARBIDE CORP.** ..... 4th Cover
Agency—J. M. Mathes Inc.

**U. S. POTASH CO. DIV. OF U. S. BORAX & CHEM CORP.** ..... 112
Agency—McCann Erickson Inc.

**U. S. RUBBER CO.** ..... 88
Agency—Fletcher D. Richards, Inc.

**U. S. STONEWARE** ..... 43
Agency—Ralph Gross Adv. Inc.

**VIRGINIA-CAROLINA CHEMICAL CORP.** ..... 14-15
Agency—Albert Sidney Noble Adv.

**WALLACE & TIERNAN INC.** ..... 110
Agency—Branstater Inc.

**WEST END CHEMICAL CO.** ..... 6
Agency—Norton M. Jacobs Co.

**WEST PENN POWER CO.** ..... 70
Agency—Fuller & Smith & Ross, Inc.

**WYANDOTTE CHEMICAL CORP.** ..... 33
Agency—Brooke, Smith, French & Dorrance Inc.


tracers SECTION

(Classified Advertising)

F. J. Eberle, Business Mgr.


**CHEMICALS: Offered/Wanted** ..... 144

**EMPLOYMENT** ..... 144

**EQUIPMENT: Used/Surplus New For Sale** ..... 144

**WANTED** ..... 144

**MANAGEMENT SERVICES** ..... 145

**SPECIAL SERVICES** ..... 144


## ADVERTISING STAFF

**Atlanta 3** ..... Robert H. Powell 1301 Rhodes-Haverty Bldg., JAckson 3-6951.

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**Chicago 11** ..... Alfred D. Becker, Jr. R. J. Claussen, 520 N. Michigan Ave., MOhawk 4-5800

**Cleveland 15** ..... Vaughn K. Dissette. 1510 Hanna Bldg. SUperior 1-7000

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**Pittsburgh 22** ..... V. K. Dissette, Room 919 Oliver Bldg., ATlantic 1-4707

**San Francisco 4** ..... William C. Woolston, 68 Post St., DOuglas 2-4600

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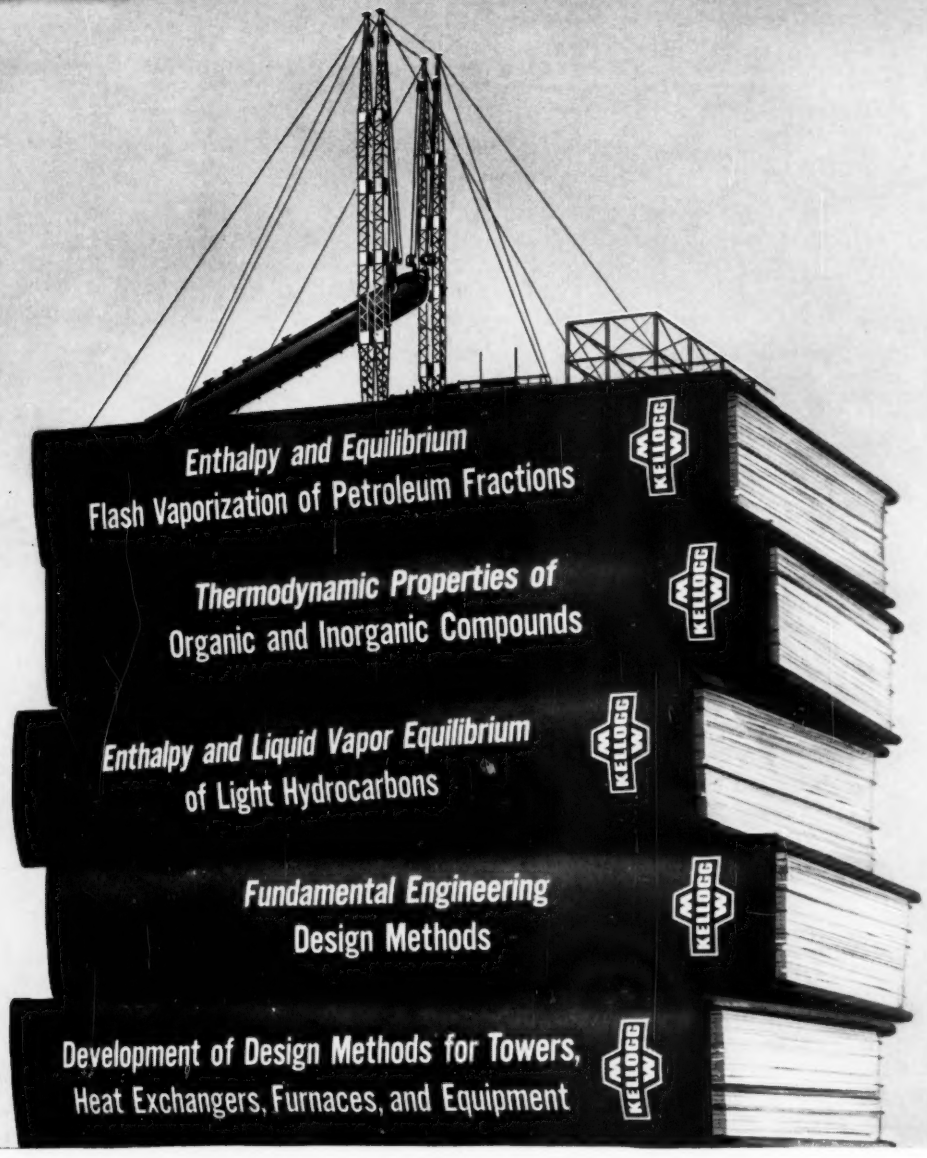


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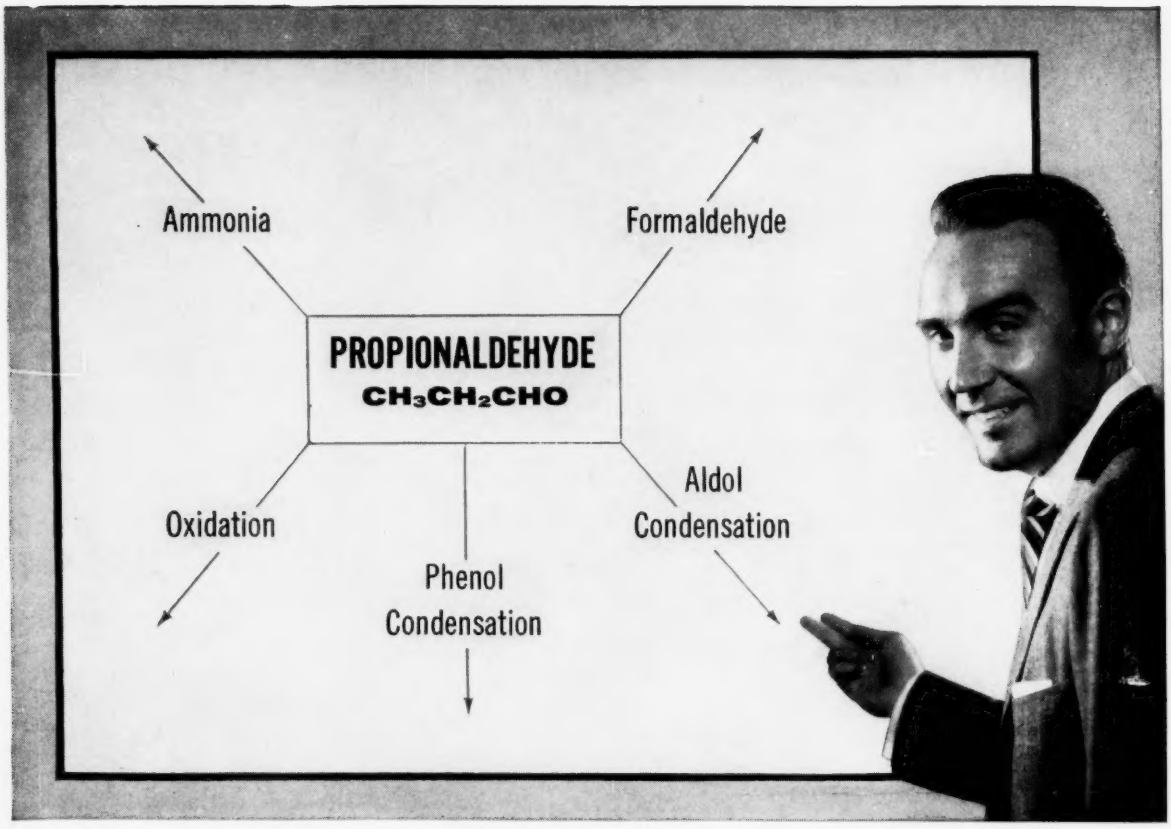


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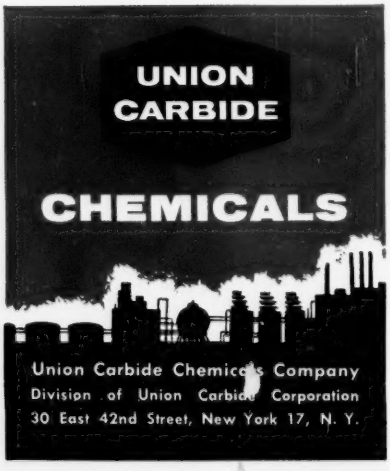


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